INVESTIGATING THE MOTIVATIONAL PROFILE OF MENTALLY TOUGH COLLEGIATE ATHLETES

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAI‘I AT MĀNOA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN EDUCATIONAL PSYCHOLOGY

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DEDICATION

Behind every word on these pages, my parents have held my hand, cleared the way, made me brave, praised my ambition, guided me step by step, encouraged me to believe in myself, loved me just as I am and stood beside me whatever my dreams may be.

I would never be who I am today without you.
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There have been many individuals by my side through all the twists and turns this academic journey has taken me. Because of their guidance and enthusiasm, my path felt a little less bumpy, not quite as daunting, and a whole lot sweeter when completed. It is a pleasure to thank the following people who made this dissertation a reality.

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I could not have stayed on course and weathered the storms without my family and friends who were my constant source of strength. You believed in me and celebrated every step of the way, no matter how big or small. I love you.

Thanks be to God who makes all things possible, giving me all that I have and all that I need. Without Him I am nothing, but with Him I can do all things through Christ who strengthens me (Phil 4:13).
ABSTRACT

This research examined the role of motivation, specifically autonomous motives and goal orientation, as it relates to the construct of mental toughness in collegiate athletes. By linking internal processes and the interpretation of social context, these constructs advance a holistic approach using positive psychological variables in explaining successful performance. University of California, Berkeley student-athletes (n = 232) representing 10 intercollegiate sports teams completed The Sport Motivation Scale (SMS; Pelletier et al., 1995), Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda, 1989; 1992), and Mental, Emotional, and Bodily Toughness Inventory (MeBTough; Mack & Ragan, 2008). Using multivariate regression to examine effects, the final model included gender with the following interactions: Task x Autonomy, Ego x Autonomy, Task x Ego x Autonomy. Task/Autonomy motivation reported significantly greater mental toughness across emotional, mental and physical sub-measures than the other two groups. Self-determination appears to be the primary theoretical framework associated with mental toughness. Yet, autonomous motives are not enough to override ego orientation at the collegiate level. Ego involvement leads to mental toughness decrements and reduced intrinsic effect whereas task involvement likely leads to greater achievement and perceived success. Scores did not seem to differ by class status, ethnicity, or sport background. Aspects such as type of sport, the sport being individual versus team focused, and whether the team recently experienced a national championship title appearance, did not have substantial bearing on mental toughness. Because the collegiate population is one step away from elite standing, it may be more worthwhile to study these participants as they refine mental toughness rather than those individuals who already have reached that level of success. The social context has a powerful effect upon forms of motivation with the development of motivational
orientations influenced by those external factors. Being able to generalize results may depend more on the competitive environment that is established by coach and team dynamics than solely on population characteristics. Interventions to move individuals into a highly motivated, mentally tough mindset might involve changes to the motivational climate, aiming to promote a greater autonomy-supportive environment, and strategies that enhance the task-oriented belief.
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CHAPTER 1. Introduction

Success in sport begins with the athlete’s determination to push his or her limits in pursuit of excellence and is maintained by the athlete’s unshakeable perseverance and strong coping skills, characterized as motivation and mental toughness respectively. Researchers have examined athletes’ views of their abilities and motivations for their success in order to better understand what is required for peak performance. Two well-known theories of motivation are self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000) and achievement goal theory (Nicholls, 1989). These theories have facilitated our understanding of motivated behavior and the resulting cognitive, affective and behavioral outcomes. The mental toughness knowledge base, however, is still at an exploratory stage of investigation with only emerging research describing this important concept from a theoretical perspective. It would be interesting to discover the links between key constructs of self-determination theory, achievement goal theory, and mental toughness as they lead to performance excellence. In particular, this study aims to show the relationships between motivation and mental toughness, pertaining to the internal processes and interpretation of social contexts that enable athletes to achieve success.

Motivation processes in performance contexts are particularly important for identifying the mechanisms by which individuals strive and meet both internal and external demands. Self-determination theory (SDT) posits that external social factors with internal psychological mediators are determinants of motivation and lead to certain consequences (Deci & Ryan, 1985, 1991; Deci, Vallerand, Pelletier, & Ryan, 1991).

Self-Determination Theory (Deci & Ryan, 1985) denotes that people can be motivated for different reasons resulting in a continuum of autonomy. In their
multidimensional approach, Deci and Ryan (1985) identified different levels of motivation and their consequences. The more fully regulation is internalized; the more autonomous the individual becomes which is the basis for self-determined behavior. At one end of this continuum is the least autonomous form of motivation that has traditionally been presented as extrinsic motivation, and occurs when a person performs activities either to obtain rewards, or to avoid punishments or sanctions. At the opposite end are activities that are intrinsically motivated, a highly autonomous form of motivation in which an activity is engaged in because of its inherent satisfactions such as fun, interest, or the challenge it offers.

A number of studies in the sport and exercise domain have indicated that behavioral regulation along the SDT continuum would lead to qualitatively different cognitive, affective or behavioral consequences for athletes (Standage, Duda, & Ntoumanis, 2003; Standage & Vallerand, 2008; Taylor, Ntoumanis, & Standage, 2008; Vlachopoulos, Karageorghis, & Terry, 2000). Highly autonomous regulations such as identified regulation and intrinsic motivation are expected to correspond with more positive outcomes such as increased perceptions of satisfaction, competence and persistence, whereas less self-determined forms of regulation (external and introjected regulations) correspond with more negative outcomes, such as poor focus and poorer levels of performance. However, some studies have suggested that autonomous regulations do not always correspond with more positive outcomes and that elite athletes have multiple motives for participating in sport (Chantal, Guay, Dobreva-Martinova, & Vallerand, 1996; Mallett & Hanrahan, 2004). For example, the arduous training, demanding competition schedules, and emotional and physical pain associated with high level sport experiences points to external rewards such as money or social status as
possible reasons for sustaining involvement. Accordingly, Deci and Ryan added to their research a sub-theory to better incorporate the intricacies that define participation.

Deci and Ryan’s (1985) organismic integration theory (OIT), a mini-theory embraced by the larger self-determination theory framework, describes different types of motivation that vary in the degree to which a behavior has been internalized and integrated into an individual’s sense of self. This theory takes into account different motives athletes have in athletics. The types of motivation they define can range from an internal desire to work hard and achieve success to motivation that is external in nature when focus is placed on the fame or rewards associated with the outcome.

Individuals often partake in achievement situations to demonstrate competence or ability (Nicholls, 1989). In achievement goal theory, how people think about or define competence manifests in two different states of motivational involvement: ego and task involvement (Nicholls, 1989). Athletes who are task-oriented use self-referenced criteria in order to judge success. They connect competence to skills development and personal improvement. On the other hand, athletes who are ego-oriented judge their ability by social comparison. These athletes believe success is defined as outperforming others and place value on external rewards and praise. A combination of personal factors and contextual cues can lead to athletes becoming task or ego-oriented. Elite athletes, however, are reported to be both highly task-oriented and highly ego-oriented (Pensgaard & Roberts, 2002). Researchers have speculated that to be productive at this peak level, athletes require the best of both goal dispositions—having a structure that emphasizes learning and mastery in a competitive climate that has built in rewards (Mallet & Hanrahan, 2004; Roberts, 2001; Treasure, Lemyre, Kuczka, & Standage, 2007).
Collegiate athletics has become the gateway to elite performance. For most athletes, it is their final opportunity to compete for national prominence that will advance them to an Olympic or professional status. As a result, this competitive system draws in individuals who have experienced a great deal of athletic success by being part of high-caliber teams throughout their career. While their current performance level may not have yet reached the highest level of their chosen sport, research conducted on collegiate athletes would more closely mirror the elite group than recreational level participants.

My research will investigate the role of motivation, specifically autonomous motives and goal orientation, as it relates to the construct of mental toughness in collegiate student-athletes. In particular, examining the function of self-determination theory and achievement goal theory will facilitate a deeper knowledge of the mechanisms and processes underpinning the development of mental toughness. Similar to motivational theories, mental toughness is a multi-dimensional concept that combines internal processes with social contexts in order to reach benchmarks for success. Autonomous motivation represents internal and external factors that drive the athlete’s behavior and determine focus and persistence (Deci & Ryan, 2000). Goal orientation illustrates how athletes regard the challenge, and in turn, how their perceived competence directs their performance (Ames, 1992). Self-determination theory provides a theoretical framework for understanding these components of motivation as it acknowledges intrinsically and extrinsically motivated activity and pinpoints the factors that either enhance or hamper athletic performance (Deci & Ryan, 2000). This study sets out to demonstrate how the relationships between motivational constructs and mental toughness may cause them to foster similar desirable outcomes related to performance.
The complexity of mental toughness eludes researchers from clearly defining its structure and where emphasis should be placed in developing this construct in athletes. By outlining the motivational profile of mentally tough athletes, this research will identify the personal variables required and ideal social contexts necessary to predispose individuals for this performance-related construct. While mental toughness is a sport specific concept, better understanding of this construct will add value to other venues where mental toughness will boost performance, such as academics, occupational success, and entrepreneurial enterprises.

Specifically, the purpose of this research is to examine the relationships among independent variables of self-determination constructs and goal orientations, and the dependent variable of global mental toughness and emotional, mental and physical aspects for collegiate athletes. While individuals may engage in an activity for various reasons, it remains to be determined how these reasons affect the way athletes mentally cope with demands encountered in sport performance. It is hypothesized that athletes with intrinsic motivation and task-orientation or a combination of task and ego-orientation will have higher levels of mental toughness than athletes with only ego-orientation.
CHAPTER 2. Exploring Constructs of Motivational Theory and Mental Toughness

Motivation, goal orientation, and mental toughness may differentially impact cognition, affect and behavior of athletes in a competitive environment. Together, these concepts all affect the interaction of personal variables with the interpretation of the social context in order to facilitate positive consequences as shown in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Mental Toughness and Motivational Theory Constructs</th>
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<tbody>
<tr>
<td><strong>Driving Force</strong></td>
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<td>Personal Variables</td>
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<td>Internal Processes</td>
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<tr>
<td><strong>Mental Toughness</strong></td>
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<tr>
<td>Different Human Components:</td>
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<tr>
<td>- Values</td>
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<tr>
<td>- Attitudes</td>
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<td>- Cognitions</td>
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<tr>
<td>- Emotions</td>
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<tr>
<td>The way an individual approaches, responds and appraises the social context</td>
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<tr>
<td><strong>Self-Determination Theory</strong></td>
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<tr>
<td>How an active organism integrates new experiences with one’s intrinsic self</td>
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<tr>
<td><strong>Achievement Goal Theory</strong></td>
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<td>Task orientation</td>
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In the following section I will discuss the research literature on mental toughness, self-determination theory, and goal orientation, in order to provide the groundwork for the proposed methodology.

Defining Mental Toughness

Classic sport psychology work credits mental toughness as the most important psychological characteristic in determining competitive success (Gould, Hodge, Peterson, & Petlichkoff, 1987; Loehr, 1982; Williams, 1998). Champion athletes with
mental toughness are believed to possess certain mental characteristics and behavioral attitudes that enable them to excel far beyond their physical capacities (Gould, Dieffenbach, & Moffett, 2002). Coaches, sport psychologists, and athletes are continually driven to find the secret to developing this performance characteristic (Clough, Earle, & Sewell, 2002; Jones, Hanton, & Connaughton, 2002). While most sport figures highly regard this concept, the research world has struggled to define and refine exactly what it takes to be “mentally tough.”

Loehr (1982, 1986) was perhaps the first to popularize the term mental toughness and he contended that at least 50% of superior athletic performance could be attributable to mental factors. His extensive applied work with elite athletes and coaches provided the catalyst for empirical interest in this elusive concept. Table 2 summarizes the evolution of definitions for mental toughness to date.

Table 2

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Sample</th>
<th>Components/Definition</th>
</tr>
</thead>
</table>
| Fourie & Potgeiter (2001) | 131 expert coaches and 160 elite athletes | 12 components  
  - motivation level  
  - coping skills  
  - confidence  
  - maintenance  
  - cognitive skill  
  - discipline and goal-directedness  
  - competitiveness  
  - possession of prerequisite physical and mental requirements  
  - team unity  
  - preparation skills  
  - psychological hardiness  
  - religious convictions and ethics |
Table 2. (Continued)

Summary of Mental Toughness Definitions

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Sample</th>
<th>Components/Definition</th>
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<tr>
<td>Jones, Hanton, &amp; Connaughton (2002)</td>
<td>Ten international performers</td>
<td>Definition: “having the natural or developed psychological edge that enables you to generally cope better than your opponents with the many demands that sport places on a performer and specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure” (p. 209). In addition, 12 attributes covered the areas of self-belief, desire/motivation, focus (performance and lifestyle-related), dealing with competition-related pressure and anxiety, and dealing with physical and emotional pain.</td>
</tr>
<tr>
<td>Jones, Hanton, &amp; Connaughton (2007)</td>
<td>Eight Olympic or world championship athletes, along with three coaches and four sport psychologists who worked with this population</td>
<td>Reinforced previous definition and added 4 dimensions: • attitude/mindset • training • competition • post-competition</td>
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<tr>
<td>Clough, Earle, &amp; Sewell (2002)</td>
<td>Based on applied work with elite rugby league players</td>
<td>4C model with constructs of control, commitment, challenge, and confidence Definition: “Mentally tough individuals tend to be sociable and outgoing; as they are able to remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others. With a high sense of self-belief and an unshakeable faith that they can control their own destiny, these individuals can remain relatively unaffected by competition or adversity” (p.38).</td>
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Table 2. (Continued)

### Summary of Mental Toughness Definitions

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Sample</th>
<th>Components/Definition</th>
</tr>
</thead>
</table>
| *Middleton, Marsh, Martin, Richards, & Perry (2004)* | 33 current or former elite athletes, and eight sport professionals (sports scientist, coach, psychologist, management) | **12 multi-dimensional factors included:**  
  - self-efficacy  
  - mental self-concept  
  - potential  
  - task specific attention  
  - perseverance  
  - task familiarity  
  - personal bests  
  - task value  
  - goal commitment  
  - positivity  
  - stress minimization  
  - positive comparisons  
  Definition: “an unshakeable perseverance and conviction towards some goal despite pressure or adversity” (p. 6) |
| *Bull, Shambrook, James, & Brooks (2005)* | Top 12 English cricketers from previous two decades recognized as the mentally toughest | Global themes of tough thinking, tough attitudes, tough character, with environmental influence as the foundation |
| *Thelwell, Weston, & Greenlees (2005)* | Six male professional soccer players | Confirmed Jones et al. (2002) within context of professional soccer |
| *Gucciardi, Gordon, & Dimmock (2008)* | 11 male coaches from Australian Football Leagues | **Personal construct framework**  
  Definition: “a collection of experientially developed and inherent sport-specific and sport-general values, attitudes, emotions, and cognitions that influence the way in which an individual approaches, responds to, and appraises both negatively and positively construed pressures, challenges, and adversities to consistently achieve his or her goals” (p. 278) |

In a pioneering qualitative study, Fourie and Potgeiter (2001) analyzed written responses from 131 expert coaches and 160 elite athletes and identified 12 components of
mental toughness (motivation level, coping skills, confidence maintenance, cognitive skill, discipline and goal-directedness, competitiveness, possession of prerequisite physical and mental requirements, team unity, preparation skills, psychological hardiness, religious convictions and ethics). This work provided a good foundation for further studies, although the authors did not define mental toughness, and the use of open-ended written responses inhibited the researchers from following up on the participants’ comments to develop their ideas (Gucciardi, Gordon, & Dimmock, 2009a).

Jones et al. (2002) attempted to operationalize mental toughness and determine the specific dimensions that constitute a mentally tough performer. Through a three-stage research approach that incorporated focus groups, one-on-one interviews, and rank-order tasks, elite performers brainstormed how to define mental toughness and list the fundamental attributes that underpin the concept. They defined mental toughness as

... having the natural or developed psychological edge that enables you to generally cope better than your opponents with the many demands that sport places on a performer and specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure. (p. 209)

In addition, Jones et al. concluded that 12 attributes are required in order to be mentally tough. These cover the areas of self-belief, desire/motivation, focus (performance and lifestyle-related), dealing with competition-related pressure and anxiety, and dealing with physical and emotional pain. The definition associates mental toughness with being able to cope with adversity in competitive situations, and handle the unique demands arising from the lifestyle of an elite athlete. The numerous components of mental toughness they identified reinforce the notion that this construct is multidimensional.
Their definition reflects the elements needed for athletes to achieve mental toughness as well as the desired end state of being mentally tough.

Criticisms of this model have been widespread. The researchers’ focus on the outcomes of mental toughness has been criticized as describing what mental toughness allows an athlete to do, rather than defining the construct itself (Crust, 2007). Moreover, the outcome dimension emphasized as success implies that only elite performers can truly attain mental toughness (Gucciardi et al., 2009a). This reference to beating opponents reflects superior athleticism rather than a superior ability to deal with, overcome and thrive through the many challenges and pressures associated with an athletic career. Lastly, critics contend that no attempt was made to relate the qualitative discussion to established theory as a means to facilitate a deeper understanding of key mental toughness attributes (Middleton, Marsh, Martin, Richards, & Perry, 2004b).

Jones and colleagues followed this study in 2007 with a sample of eight athletes who have achieved ultimate success in their respective sports, along with three coaches and four sport psychologists who worked with this population. These elite performers and their supporters reinforced Jones et al.’s (2002) definition of mental toughness and identified 30 attributes in 4 dimensions: (a) attitude/mindset, (b) training, (c) competition, and (d) post-competition. The attitude/mindset dimension represents a general attitude that the ideal mentally tough performer possesses, whereas the other three dimensions describe mental skills and strategies needed in each specified time phase (training, competition, post-competition). By tying attributes to settings, these data have the potential to help athletes identify and develop attributes that play a crucial role in achieving top performance. Jones et al.’s (2007) definition reinforces the significance of situational influence in mental toughness components.
Clough et al. (2002) attempted to integrate psychological theory examining “hardiness” with applied sport psychology to develop a model of mental toughness. Hardiness is conceptualized as a collection of attitudes, beliefs and behavioral tendencies consisting of control, commitment and challenge that provide an individual with resistance to negative life experiences such as stress and anxiety (Maddi, 2006). These authors proposed that hardiness and mental toughness share the same constructs of control, commitment and challenge, but identified confidence as part of mental toughness to differentiate the two terms. This is consistent with other literature (Bull, Shambrook, James, & Brooks, 2005; Fourie & Potgieter, 2001; Jones et al., 2002).

According to Clough et al.’s 4C model, mentally tough individuals view negative experiences as a challenge to overcome and a natural and essential catalyst for growth and development. They also believe that they are influential in dealing with and controlling these experiences. They are deeply involved in what they are doing and committed to achieving their goals, and are confident in their abilities to deal with and overcome these negative experiences. Clough et al. proposed the following definition:

Mentally tough individuals tend to be sociable and outgoing; as they are able to remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others. With a high sense of self-belief and an unshakeable faith that they can control their own destiny, these individuals can remain relatively unaffected by competition or adversity. (p. 38)

While novel in their approach, the 4C’s model (Clough et al., 2002) has been criticized as not developed on the basis of empirical work but on existing hypothesized related constructs and research from non-sporting populations (Crust, 2007). Furthermore, this conceptualization of mental toughness is problematic because it is not grounded in sport culture or collected in conjunction with data from sport practitioners,
players, or coaches. Further research is needed to confirm the association of hardiness with mental toughness in the sport community.

Through qualitative research with elite athletes and professionals such as sports scientists, coaches, psychologists and managers, Middleton et al. (2004a; 2004b) linked established relevant theory to constructs of mental toughness in order to develop measurement tools for future work. Data and theory were considered jointly to identify and clarify constructs relevant to mental toughness and to develop a framework within which inter-relationships could be considered. Twelve multi-dimensional factors included (a) self-efficacy, (b) mental self-concept, (c) potential, (d) task specific attention, (e) perseverance, (f) task familiarity, (g) personal bests, (h) task value, (i) goal commitment, (j) positivity, (k) stress minimization, and (l) positive comparisons. Middleton et al. (2004a) concluded that mental toughness is defined as “an unshakeable perseverance and conviction towards some goal despite pressure or adversity” (p. 6). The authors indicated that there are specific actions that display mental toughness (emotional management, perseverance, and task focus) and also personal characteristics that direct an individual to be mentally tough (self-belief, commitment, attitude, and task familiarity). Athletes do not necessarily require all of these factors to be considered mentally tough. Instead, the researchers hypothesized that athletes use different combinations of factors in the model. They suggested that future research may identify a core group of factors essential for mental toughness and determine the level of contribution each component provides.

Bull et al. (2005) gained greater insight into mental toughness within the specific context of the sport of cricket. Their objective was two-fold: to gain better understanding of mental toughness within their sport, and to identify how mentally tough English cricketers developed these characteristics. They analyzed focused interview transcripts of
players identified as being the mentally toughest performers over the previous two decades, and created a hierarchical pyramid structure to illustrate the global themes of “tough thinking,” “tough attitudes,” and “tough character,” with “environmental influence” as the foundation. While at first glance, these general dimensions do not represent new knowledge per se, the systematically constructed framework that highlights relationships between the separate items is interesting. There are similarities to Jones et al.’s (2002) attributes with a sport-specific sample. What sets this model apart is the “environmental influence” base that represents a combination of characteristics as well as lessons learned from the environment. This critical addition to the existing definition of mental toughness accentuates the need to experience alternative and challenging environments throughout childhood and a player’s athletic career. This may include a wide range of situations that are “teachable moments” such as opportunities to survive early setbacks or playing the sport in a foreign country. With a strong core of resilience created by these experiences, the performer develops the consistency needed for performance excellence. These findings suggest that a difficult pathway to success develops these psychological skills in appropriate environments, and is a better way of developing mental toughness than traditional isolated programming.

Thelwell, Weston, and Greenlees (2005) used semi-structured interviews to confirm the findings of Jones et al. (2002) within the context of professional soccer. Closely reflecting that definition, soccer players who demonstrated attributes resembling a high level of self-belief and an ability to cope with the internal and external pressure that elite sport placed on them tend to be perceived as mentally tough. Interestingly, some players commented on the role that the environment played in enhancing their mental toughness. Respondents identified various environmental challenges such as team tryouts, training with a national squad, and traveling overseas for competition as
shaping their coping mechanisms, and researchers recommended exposing young players to similar situations early in their careers in order to develop mental toughness for their professional careers.

Bull et al. (2005) and Thelwell et al. (2005) also emphasized the importance of external factors that challenge the athlete’s inner processes as they refine their own mental toughness. Similarities between the global themes identified in these two studies and the mental toughness attributes proposed by Jones et al. (2002) are encouraging and increase the trustworthiness of Bull et al., and Thelwell et al.’s data. As research examines sport-specific versus diverse sport groupings, mental toughness appears to be developing into one all encompassing definition with shared qualities regardless of the sport perspective.

Most recently, Jones et al.’s (2002) definition of mental toughness has been revisited. Gucciardi and colleagues (2008) used Kelly’s (1955/1991) personal construct framework to conceptualize this multidimensional psychological construct. Personal construct psychology is based on a ‘man [sic]-the-scientist’ (p. 4) metaphor in which Kelly (1955/1991) proposed that people engage in making meaning of the world around them by anticipating and making predictions about their experiences, much like a research scientist. Gucciardi et al. (2008) proposed a process model of mental toughness to better understand how athletes achieve their goals and their associated outcomes. The key components of mental toughness influence the way in which an individual covertly and overtly approaches, appraises, and responds to events demanding varying degrees of challenge, adversity, and pressure. Evaluative processes, including feedback from the self and others (coaches, peers), are then engaged in to either confirm or reject one’s anticipations, which have important implications for the development and maintenance
of key mental toughness characteristics. Gucciardi et al.’s construct definition depicts this conceptualization as follows:

Mental toughness is a collection of experientially developed and inherent sport-specific and sport-general values, attitudes, emotions, and cognitions that influence the way in which an individual approaches, responds to, and appraises both negatively and positively construed pressures, challenges, and adversities to consistently achieve his or her goals. (p. 268)

Previous definitions have defined mental toughness as a response to adversity, and further conceptualized this construct in its role in overcoming such hardship (Clough et al., 2002; Middleton et al., 2004b). While it seems like mental toughness encompasses aspects of resilience and hardiness, where one has to deal with and overcome situations with negative effects, it also enables one to thrive in situations where there are positive challenges and pressures. Gucciardi et al. (2009a) acknowledged that mental toughness can be conceptualized as a buffer against difficulties, but also is a collection of interrelated protective and enabling factors that promote and maintain adaptation to other positive situations.

Utilizing the underlying principles of personal construct theory, researchers have extended the concept of mental toughness (Gucciardi et al., 2009b). Rather than focusing solely on identifying and describing key characteristics associated with mental toughness, investigators have attempted to identify and understand situations that demand a high degree of mental toughness and the behaviors that mentally tough athletes display in these situations. In one study using elite club soccer players, coaches and parents from Australia, researchers asked participants to identify key characteristics, situations, behaviors, and cognitions associated with the mental toughness construct
(Coulter, Mallett, & Gucciardi, 2010). Researchers used this information to synthesize an understanding of how the key mental toughness characteristics operate the psychological processes of mentally tough soccer players. Consistent with findings from past research, 14 global action and personality characteristics emerged from the qualitative information generated by the three participant groups. These findings confirm the multivariate nature of the construct, providing further support for the view that a core group of attributes characterize mental toughness across sports. Furthermore, the results acknowledge a shared belief among groups of individuals within the athletes’ network that a winning mentality and desire, self-belief, work ethic, and resilience are important characteristics that embody mental toughness within the soccer context. This is a significant finding because it emphasizes that there is agreement across several populations on what mental toughness represents, thus contrasting initial critiques that the construct could include virtually any desirable positive psychological characteristics associated with sport achievement. The strength in this approach to mental toughness is the theoretically driven framework of personal construct psychology in which an individual’s views, experiences, meanings, and perceptions are articulated and understood to provide a more comprehensive examination of the phenomenon (Gucciard et al., 2009a).

While it is important to acknowledge recurring themes of difficulty and challenges, mental toughness has been found to be multi-dimensional with a vast number of related attitudes, behaviors, personal characteristics, and skills that still leave the definition and understanding of this concept quite nebulous (Crust, 2007). Common components across all sports sampled thus far were (a) self-belief/confidence, (b) attentional control, (c) self-motivation/work ethic, (d) positive and tough attitude, (e) enjoy and handle pressure, (f) resilience, and (g) quality preparation. Perhaps a
A constellation of core psychological characteristics might not vary significantly across sports. Nevertheless, some unique qualities are sport-specific, suggesting that mental toughness may be somewhat contextually bound (Crust, 2008).

Different methods of data collection have advanced the understanding of mental toughness. Fourie and Potgeiter (2001) employed open-ended responses; Jones et al. (2002) utilized individual and group interviews; Middleton et al. (2004a) used interviews, then developed these ideas into a model supported by theory; and Gucciardi et al. (2009b) started with a particular theory to guide their research of the process of becoming mentally tough. Most research has relied on qualitative measures that can provide rich, descriptive data, but the design and use of appropriate psychometric instruments is needed to better refine the definition, components and levels of mental toughness.

### Measuring Mental Toughness

Attempts to develop an accurate measure of mental toughness are challenging in the absence of a consistent operational definition and model. Table 3 summarizes the different instruments designed to assess mental toughness.

Table 3

*Measurements for Mental Toughness*

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Instrument Design</th>
<th>Subscales</th>
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<tbody>
<tr>
<td>Psychological Performance Inventory (Loehr, 1986)</td>
<td>42 item self-report inventory on a 5-point Likert scale</td>
<td>7 subscales:</td>
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<tr>
<td></td>
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<td>• self-confidence</td>
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<td>• negative energy control</td>
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<td>• visualization &amp; imagery control</td>
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Table 3. (Continued)

Measurements for Mental Toughness

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Instrument Design</th>
<th>Subscales</th>
</tr>
</thead>
</table>
| Mental Toughness Questionnaire-48 (Clough et al., 2002) | 48 item self-report inventory on a 5-point Likert scale | 4 subscales:  
- Control  
- Commitment  
- Challenge  
- Confidence |
| Mental Toughness Inventory (Middleton et al., 2004a) | 67-item self-report inventory on 8-point true-false response scale | 12 subscales:  
- self-efficacy  
- mental self-concept  
- potential  
- task specific attention  
- perseverance  
- task familiarity  
- personal bests  
- task value  
- goal commitment  
- positivity  
- stress minimization  
- positive comparisons |
| Mental, Emotional, and Bodily Toughness Inventory (Mack & Ragan, 2008) | 43-item self-report inventory on 4-point Likert scale | 3 elements:  
- emotional  
- mental  
- physical |
| Australian football Mental Toughness Inventory (Gucciardi et al., 2009b) | 24-item self-report inventory on a 7-point Likert scale | 4 factors:  
- thrive through challenge  
- sport awareness  
- tough attitude  
- desire success |

Based on the work he did with athletes and coaches, Loehr (1986) identified seven factors as the most essential characteristics of mental toughness. The Psychological Performance Inventory (PPI; Loehr, 1986) is a 42-item self-report inventory with seven subscales, designed to measure factors that reflect mental toughness in an athlete. Each subscale consists of six items measuring seven fundamental areas: (a) self-confidence (“I believe in myself as a player”), (b) negative
energy control (“I can remain calm during competition when confused by problems”), (c) attentional control (“I can clear interfering emotion quickly and regain my focus”), (d) visualization and imagery control level (“Before competition, I picture myself performing perfectly”), (e) motivation (“The goals I’ve set for myself as a player keep me working hard”), (f) positive energy control (“I can keep strong positive emotion flowing during competition”), and (g) attitude control (“I am a positive thinker during competition”).

The responses were indicated on a 5-point Likert scale (1 = almost always; 5 = almost never). Middleton et al. (2004d) evaluated the construct validity of the PPI through confirmatory and exploratory factor analysis with a sample of Australian elite high school student-athletes. The researchers concluded that the PPI did not have adequate psychometric properties and given that the measure was not developed with a sound theoretical framework, empirical support is needed before it can be used as a viable instrument.

Clough and colleagues (2002) developed the Mental Toughness Questionnaire-48 (MT48) to assess their 4C’s conceptualization (Control, Commitment, Challenge, and Confidence) of mental toughness. The MT48 contains 48 items that are scored on a 5-point Likert scale (1 = strongly agree; 5 = strongly disagree). The MT48 has an overall test-retest coefficient of 0.9, with the internal consistency of the subscales found to be 0.73, 0.71, 0.71, and 0.8 respectively. There is support for construct validity of the MT48 in terms of low-to-moderate correlations with related constructs such as leadership preferences, coping, optimism, stress intensity, and control appraisal (Clough et al., 2002; Nicholls, Polman, Levy, & Backhouse, 2008; 2009). However, researchers found different factor structures; originally Nicholls et al. identified 4-factors, and subsequently they reported 6-factors in confirmatory factor analysis studies (Nicholls et al., 2008; 2009). As discussed earlier, the 4C’s model was developed outside of the
sporting population, and no research to date has proved the association of hardiness and mental toughness that is the basis for the MT48 (Connaughton, Wadey, Hanton, & Jones, 2008).

Based on their qualitative research with elite-level athletes and sport professionals, Middleton and colleagues (2004a) developed a Mental Toughness Inventory (MTI) along with their model of mental toughness that is both multi-dimensional and hierarchical. Their 67-item self-report test is designed to measure 12 separate components of mental toughness: (a) self-efficacy, (b) mental self-concept, (c) potential, (d) task specific attention, (e) perseverance, (f) task familiarity, (g) personal bests, (h) task value, (i) goal commitment, (j) positivity, (k) stress minimization, and (l) positive comparisons, as well as a global mental toughness score. Psychometric testing results were good, yielding reliabilities for each of the factors ranging from .87 to .95 and acceptable goodness-of-fit with confirmatory factor analysis.

Mack and Ragan (2008) developed the Mental, Emotional, and Bodily Toughness Inventory (MeBTough) based on Loehr’s (1994) 3-dimensional concept that delineated mental toughness into mental, emotional, and physical elements. The physical dimension refers to being well prepared and acting tough. The mental element involves the ability to cope and access appropriate emotions for an optimal performance state. The emotional component focuses on flexibility, responsiveness, strength, and resiliency. The 43-item measure provides concrete strategies for being able to perform consistently toward the upper range of one’s ability, regardless of competitive circumstances. The inventory was validated using the Rasch model which is designed to discriminate among individuals along a wide ability range with a high degree of confidence that item placement would remain the same regardless of sample. What makes this type of calibration unique is that it relies on norm-reference-based scoring which allows
practitioners to explain results more consistently and compare them across studies in order to increase understanding of results. The measure demonstrated good model-data fit with acceptable fit statistics (mean infit mean square = 1.0 ± 0.5, mean outfit mean square 1.0 ± 0.5). The items’ difficulties had good variability along the measurement scale with item separation index and separation reliability statistic at 6.31 and .98, respectively. CSEM which measures the precision of the tool to depict a specific ability level was fairly consistent across the ability range (0.24 to 0.34 logits).

Using Gucciardi et al.’s (2008) research grounded in personal construct psychology, Gucciardi, Gordon, and Dimmock (2009b) created the Australian football Mental Toughness Inventory (AfMTI) as a sport-specific instrument. Their definition highlighted the interaction of three components: characteristics, situations, and behavior central to the conceptualization of mental toughness in Australian football. The resulting 24-item inventory was designed to measure four factors of mental toughness: (a) thrive through challenge, (b) sport awareness, (c) tough attitude, and (d) desire success. Responses are provided on a 7-point Likert scale (1 = false; 7 = true). Preliminary data on factor structure, internal reliability, and construct validity of AfMTI were encouraging, but further psychometric examination is necessary to establish it as a useful measure of mental toughness (Gucciardi et al., 2009b).

Collectively, these mental toughness measures have established various perceptual and behavioral differences among participants (Crust, 2008). Researchers wanting to investigate mental toughness more objectively will benefit from utilizing measures developed from both a theoretical and applied base. Given that all these instruments rely on self-reported means, there is a danger for socially desirable responding. If overt behaviors of mental toughness can be further verified, then supplemental analysis employing performance data and observational information will
provide additional support for construct validity. More extensive usage of the instruments with further testing of validity and reliability will allow for a more precise measurement to be developed.

**The Importance of Generalizability**

The term mental toughness is used frequently to explain why certain athletes have attained successful performance in sport. These accounts have resulted in different definitions, measurement tools, and intervention strategies that attempt to capture exactly what mental toughness is. As researchers examine this concept, they cannot simply observe a person and be able to record a complete measure of mental toughness traits. Instead, they must rely on potential indicator variables to form a construct of the performance trait (Cook & Campbell, 1979). Psychological constructs provide an efficient and convenient method for labeling a number of similar behaviors. Through the use of constructs, the observer can begin to classify and group instances of similar behavior and communicate in compact terms what has been witnessed. Only after a collection of findings across people, situations, and times with similar results can a psychological construct be useful, and generalized across domains (Campbell & Stanley, 1963). The challenge presented is, when do we know with confidence that research can be broadened to different populations or conditions, and how do psychological constructs transfer to other contexts where it may be useful.

Mental toughness is comprised of multiple psychological dimensions with the conceptualization that the whole is greater than the sum of its parts. Champion athletes with mental toughness are believed to possess certain mental characteristics such as confidence, resiliency, competitiveness, and motivation that enable them to excel far beyond their physical capacities (Gould et al., 2002). Qualitative and quantitative approaches to studying mental toughness are evaluated not only for accuracy in
representing the construct but also for the extent that conclusions would hold beyond the sample populations. There is no absolute guarantee that the results obtained in a study will occur in every situation outside the test environment. In order to determine causal relationships in research, precision is of utmost importance. Yet if researchers wish to generalize their findings, scope and variance must be emphasized. The relationship between internal validity and external validity is as one goes up, the other goes down. As researchers implement more control to reduce confounding variables and increase internal validity, they are making the experiment more and more artificial and thereby, generalizability and external validity often suffer. One method to balance control techniques is to increase the number of observations because this raises power but allows for random error among the sample to average out (Campbell & Stanley, 1963).

To test generalizability, researchers have approached mental toughness from many angles. They have studied the construct as a general concept that is equally applicable to all sport populations as well as from sport-specific perspectives that focus on participants and coaches from single sports. For example, Middleton et al. (2004b) used participants from a diverse range of sports, which included archery, track and field, basketball, cricket, rugby, boxing, mountain climbing, and disability sports. In contrast, Bull et al. (2005) and Thelwell et al. (2005) studied mental toughness in cricket and soccer players respectively. Also, researchers have examined the perspectives of athletes (Bull et al., 2005; Jones et al., 2002; Thelwell et al., 2005), and have incorporated views of coaches, sport professionals, and even parents (Coulter et al., 2010; Fourie & Potgieter, 2001; Gucciardi et al., 2008; Middleton et al., 2004a). While there is no clear definition or consensus yet, the researchers are finding relatively consistent themes across the studies, which benefits generalizability.
While generalizability refers to a sport-specific transfer, transferability reflects a contextual transfer of skills. It is important to recognize that there is a core set of skills that all individuals need to know and that many individuals can also effectively apply these skills learned in one environment to other environments as appropriate (Danish, Petitpas, & Hale, 1993). The skills needed to enhance sport performance and to succeed in life are basically the same (Danish, Forneris, & Wallace, 2005). Moreover, when skills are taught so that the learner understands that the skills are transferable and knows how to transfer the skills from one domain to another, the effect can be very powerful. Programs are beginning to take advantage of the sport environment as a training ground for life (Danish, 2002a; 2002b; Danish et al., 1993). Participants are taught to use a variety of skills to improve their athletic performance, to recognize situations both in and out sports requiring these skills, and then to apply them in sport and non-sport settings.

**Transferring mental toughness to other domains.** Middleton et al. (2004b) suggested that mental toughness has broad relevance beyond sports that possibly includes other performance settings such as the performing arts, military, and business. This issue has not been extensively studied, but theoretically mental toughness can be a characteristic that allows individuals to effectively handle stress and adversity in a wide range of circumstances. Core components of mental toughness can be identified, along with specific components required by the demands of a particular sport or setting (Clough et al., 2002).

Many of the skills learned in sport are transferrable to other life domains, including such abilities as performing under pressure, solving problems, meeting deadlines and challenges, setting goals, communicating, handling both success and failure, working with a team and within a system, and receiving and benefiting from feedback. Of great importance is the ability of the individual to recognize that the skills
are transferable and have value in other domains beyond athletics. Sport serves as the vehicle to learn and develop these skills for other areas (Danish et al., 1993). Mental toughness has the potential to be of critical value not just in sport, but all aspects of an athlete's life.

In transferring skills from one domain to another (e.g., from sport to non-sport areas), it is important to recognize that abilities acquired in one area do not automatically transfer to another area. Understanding what is necessary for skills to be transferred and learning to transfer them are critical skills in themselves (Danish, Petitpas, & Hale, 1992). Programs using sport as their metaphor need to be aware of this, and to realize that the teaching of skills needs to be accompanied by explanations of how and why these skills will be useful later in life and in other domains.

There are a number of strategies involved in implementation that can enhance the transfer of skills. These include: designing conditions that enhance transfer of the skill at the beginning of the activity; creating similarities between the environment of the activity and the environment where the transfer is to occur; providing opportunities to practice transferring the skill during the activity; providing opportunities to reflect on the experiences; involving peers who have successfully completed the activity; and providing follow-up experiences to reinforce learning (Gass, 1985). In order to enable successful transfer of skills, the following instructional design was recommended by Danish and Hale (1981). First, teach the general concept of the skill. Next, explain and provide examples through activities for how life skills can be practiced and improved in sport settings and how these same skills can be practiced and improved in non-sport settings. Also, give numerous opportunities to practice as well as apply the skill in other areas of their lives and to develop a plan to practice the skill in these other domains (Goudas, Danish, & Theodorakis, 2005). Considerations are given to the confidence level
for the skill, the amount of energy necessary to acquire the skill, and the student-athlete’s motivation. Sometimes assistance may need to be given as far as rationale for the skill, demonstration of the skill within the new context, and feedback or evaluation of progress (Danish et al., 1993).

It is unclear whether students will transfer these skills to other learning situations (Hofer, Yu, & Pintrich, 1998). It has been argued that students’ transfer of skills across contexts, content areas, and types of tasks depends on at least three factors: knowing how to self-regulate, believing that the skill is beneficial, and possessing the skills necessary to make appropriate modifications in the transfer processes such that they match the current situation (Pressley et al., 1990). Content-area interventions, in which instructors teach skills and embed information about the transferability to other domains, have been found to be highly advantageous for learning (Schunk & Zimmerman, 1998). Research is needed to determine the extent that explicit instruction and practice in each area improves transfer. A construct is more likely to predict behavior when it is more specifically related to that behavior (McAuley & Blissmer, 2002).

It is also important to remember that athletes are active individuals. Their life experiences suggest they learn best by doing. Transferability will only go as far as the concentrated effort to make connections to domains where mental toughness is activated in other situations such as academics. Having athletes personally desire and try to cultivate these mental qualities outside of sport performance is crucial. If the intention and goal is more important to others than it is to the individual, the athlete will lack energy in the effort and the goal is likely to be unaccomplished (Danish et al., 2005). Therefore, having an active role and personal commitment in the educational process to expand a skill set and apply mental toughness to other areas is vital for success.
Utilizing this method will have important implications for education in and out of sport if athletes consciously think about and employ strategies they learn in one context to another setting. When bringing together sport with a model that promotes transfer of skills, athletes may be in a powerful position to use sport as a learning tool beyond their athletic role. To advance knowledge of mental toughness, there needs to be attempts to consider how far the concept impacts perceptions, cognitions, affect and behavior beyond an individual’s sport performance. In particular, the pattern of results found in a study can have important implications for whether or not mental toughness is generalizable to other conditions or populations.

Comparing mental toughness across sport populations. The majority of mental toughness research is limited to studying elite athletes (Bull et al., 2005; Jones et al., 2002, 2007; Middleton et al., 2004b; Thelwell et al., 2005). Given that mental toughness relates to successful outcomes, this dimension should be investigated in a sample of athletes who have accomplished ultimate achievements in their respective sports. Despite the sample sizes being small and uniform by sport, data generated from the participants in the various elite athlete studies was more than adequate in terms of richness and content. Jones et al. was able to initiate the first operational definition of mental toughness. Bull et al. and Thelwell et al. emphasized the importance of external factors for refining mental toughness. Middleton et al. developed a measurement tool for assessing characteristics of mental toughness. Each new finding mirrors previous knowledge, demonstrating some consistency in understanding what mental toughness is.

While they have reached superior performance in their sport, the question remains as to whether elite athletes are a group that is so unique that one cannot generalize beyond the tested group to the general population (Taylor, 1987). Because the nature of mental toughness is a complex compilation of factors, some other confounding
variable may be responsible for the observed results. Researchers regard mental
toughness as an important component of performance excellence and link the qualities
of successful performers to the acquisition of mental toughness. Definitions of mental
toughness often contain a dimension that relates to successful outcomes, but perhaps
this criterion is more appropriately regarded in relative, rather than absolute terms of
achievement. Although the elite are the most obvious group to study, researchers could
gain powerful insight into the development of mental toughness through empirical study
not just of those who have reached the peak of their career but also with athletes who
have maintained a consistently high level of competition over a lengthy period of time.
Athletes just entering the elite level ranks of competition may better highlight how
mental toughness is developed. The starting point is investigating a population at the
highest level, but broadening the sample to collegiate level with mixed sports can
determine if mental toughness attributes are consistently held by performers at all levels.

Individuals who are considered mentally tough may be achieving performance
excellence through different means. The purpose of the current study is to define
motivational similarities evident across a diverse sample so components and shared
qualities are recognizable, while allowing for individuality that works for each athlete in
the form of autonomy. Although generalized findings are required to shape the concept
of mental toughness, researchers need to allow athletes the control to personalize their
approach within an appropriate nurturing environment (Bull et al., 2005). In order to
generalize beyond the elite population, researchers would need to expand the definition
of mental toughness beyond those who are successful at the highest level in their sport to
include athletes who are consistently achieving their goals (Gucciardi et al., 2009a). In
addition, we need to compare experiences of amateur athletes who have not yet achieved
ultimate sporting success to those of successful elite performers.
It is necessary to study the behavioral correlates of mental toughness, where sports professionals define mentally tough versus weaker players and observe how they function in varying situations throughout competitive performance (Thelwell et al., 2005). Conceptualizing mental toughness should take into consideration both ends of the continuum, enabling researchers to more readily identify not only those individuals who are mentally tough but also those individuals who are not. Researchers endeavor to identify and understand what situations demand a high degree of mental toughness and the behaviors that mentally tough athletes display in those situations. Observational studies may be fruitful in supplementing information gleaned from self-report measures of mental toughness (Gucciardi et al., 2008). Another potential drawback for generalizability using self-reported measures is social comparison theory questioning athletes’ abilities to accurately assess their true mental toughness rating versus perceived ability. In addition, as athletes are exposed to higher levels of competition, they become more self-aware of their strengths and weaknesses within that frame of reference which could lead them to possibly report lower scores. This was observed by Middleton et al. (2004c) when elite athletes reported lower scores on mental toughness than sub-elite athletes. It is only when comparing group behavioral norms among varying ability levels that we will be able to accurately measure the appropriate mental toughness expected for each sport population and conclude if mental toughness exists only at certain levels.

Generalizability across sports can depend on several factors. Each sport has its own unique physical and psychological characteristics. Therefore a “gradient of similarity” (p. 41) is necessary in order to make wide generalizations (Judd & Kenny, 1981). For example, it would be expected that findings about football might better generalize to other sports such as rugby because they share some motor and mental qualities. Also, a broad range of the athletic population can agree on some key mental
toughness attributes but may not effectively capture context-specific components. For example, team unity is not as relevant to individual sports. Or, a characteristic that involves overcoming fear may be in the forefront of a gymnast’s mindset but probably not that of a tennis player.

With mental toughness inherently being a difficult concept to pin down due to its multidimensional constructs, emphasis in research should remain on the core mental toughness characteristics across sports in order to advance research efforts in generating how to better predict this behavior, as well as how it is developed or enhanced. Although slight variants in specific sports may exist, a general template can be determined that includes core aspects of mental toughness that can be used irrespective of sport. Recurring themes such as coping effectively with pressure, rebounding from setbacks and failures, persistence, and self-belief helps in the creation of a universal framework that encapsulates mental toughness.

**Internal Processes and Social Context of Mental Toughness**

Several important considerations for the conceptual evolution of mental toughness are discussed in the previous sections. Specifically, to clarify and advance current conceptualizations of mental toughness, researchers should be concerned with when key mental toughness characteristics are required, and what such attributes enable a mentally tough athlete to do (Gucciardi et al., 2009a). Information that helps us understand mental toughness processes and conditions in which mental toughness is required will facilitate us in better predicting behavior and providing guidance as to how to develop or enhance this desirable construct (Crust, 2008).

Mental toughness has been construed to represent a variety of positive responses to situations in athletics. These include the ability to (a) persist, (b) overcome setbacks
and poor performances, (c) cope with excessive pressure, and (d) not let adverse situations affect performance (Connaughton et al., 2008). These skills enable an athlete to have superior self-regulatory skills and remain consistently focused, confident and in control under demands of competition (Clough et al., 2002; Jones et al., 2002; Middleton et al., 2004b). However, mental toughness literature is limited at offering insights into the processes by which mental toughness operates. For example, participants in Jones et al. (2002) included an outcome dimension to mental toughness that reflects the desired end state of being mentally tough. However, they did not clarify what the “natural or developed psychological edge” (p. 209) is. Also, the processes by which mental toughness enables one to “cope better” and “be more consistent and better” than opponents are not described. Gucciardi et al. (2008) addressed these omissions by adding the different human components (values, attitudes, cognitions, and emotions) and highlighted the processes by which the key characteristics work to enable one to be mentally tough (approaches, responses, and appraisals). In addition, the benchmarks for success or failure were changed from behaviors related to an opponent to progress towards achieving personal goals. While the true test of mental toughness at the elite level is achieving success, athletes of all skill levels can be classified as being mentally tough if they are consistently achieving their goals. The personal construct model of mental toughness provides a foundation upon which empirical evidence can be combined with established psychological theory to propose a construct definition of mental toughness that includes explicit processes and outcomes (Gucciardi et al., 2008).

The personal construct theoretical perspective emphasizes the role of key mental toughness characteristics on how an individual covertly or overtly approaches, appraises and responds to situations or events that demand varying degrees of mental toughness (Gucciardi et al., 2009a). These experiences are both internal and external and may be
related to training, competition, or lifestyle issues. Ultimately, these processes make significant contributions to one’s ability to consistently achieve personal goals. Gucciardi et al. argued that mental toughness should be treated as a phenomenon involving interpersonal and intrapersonal interactions and one’s sense-making of such experiences, rather than some sort of objective personality attribute or as a post-hoc explanation of superior athletic performance.

A distinctive dimension of the mental toughness process is the athlete who thrives on external pressure and is able to cope with the internally-derived response to that pressure (Jones et al., 2002). Specifically, we need to understand what situations (internal and external) demand mental toughness and how the key characteristics enable an athlete to thrive in, as well as persevere through such situations so that we can comprehend how these protective and enabling factors can be enhanced. The external-internal paradigm was first alluded to in the key elements represented in Bull et al. (2005). Environmental influences underpinned the whole framework and set the base upon which tough character is developed. Tough thinking represents the key psychological properties of a mentally tough mind, oriented toward the competition demands of the moment. The environment provides the foundation for the development of mental toughness in a person’s upbringing and in an individual’s transition into an appropriate sport environment. Bull et al. (2005) asserted that the environment has an impact directly upon the individual and beneficial lessons are learned from exposure alone. In addition to the core components, the breadth of the base represents the impact and range of experiences—with a broader base, a more stable pyramid is created and greater consistency of achievement occurs. Players may enhance their mental toughness through being placed in challenging environments throughout their formative years. Young players who are exposed to a variety of situations in their youth will benefit later
in their careers. Bull et al. (2005) also recommended the development of an environment within which players are given maximum opportunity to benefit in terms of development of character, attitude, and thinking.

Coulter et al. (2010) highlighted the importance of specific events or situations demanding low-to-high levels of mental toughness as a central component in understanding mental toughness and its development in sport. These “critical incidents” (p. 715) require varying degrees of mental toughness resources for an individual to be successful and to thrive. If an athlete can identify and understand situations demanding mental toughness, he or she may see the potential effects mental toughness can have, influencing the manner in which he or she reacts in order to facilitate a successful outcome.

Middleton et al. (2004b) separated mental toughness into “orientation” and “strategy” components. Their definition of mental toughness is comprised of strategies they saw others or themselves using when they were being mentally tough (focused, perseverant, coping well), and also by the sources they felt influenced an individual’s orientation to be mentally tough (experience, motivational orientations). Some factors were actions responding to the external pressure (strategies), and others were personal characteristics that reflected inner mechanisms at work (orientations). The authors differentiated between strategies and orientations in order to highlight the fact that not only did the athletes need to possess abilities; they had to be able to make use of them at critical performance moments in order to be perceived as mentally tough. From a developmental perspective, mental toughness results from interactions among our internal processes and external environments. Exposing athletes to a variety of experiences, challenges, and adversities may facilitate the development of mental toughness.
To gain a deeper understanding of this construct one must consider the processes of mental toughness, and in particular, the interactions between individual differences and situational variance. By looking at motivation and achievement goal theory and corresponding them with the characteristics, situations and behaviors central to a conceptualization of mental toughness, researchers can advance the theory on mental toughness.

**Self-Determination Theory**

It has been argued that the term motivation is an overused and vague concept (Roberts, 2001). There are at least 32 theories of motivation that have their own definitions of the construct (Ford, 1992), and there are almost as many definitions as there are theorists (Pinder, 1984). However, an important assumption agreed to by most contemporary theorists is that motivation is not an entity, but is a process (Maehr & Braskamp, 1986). To understand motivation, we must make an attempt to understand the process of motivation and the constructs that drive it.

One theory well suited for examining the potential implications of the social environmental influence on positive psychological states is the self-determination theory (Ryan & Deci, 2000). Self-determination theory (SDT) addresses the facilitating conditions necessary for self-regulation and psychological well-being. The theory postulates that the fulfillment of psychological needs of competence, autonomy, and relatedness supports healthy functioning and self-regulated behavior (Ryan & Deci, 2000). In this framework, individuals seek support for these needs in order to have a positive environment that nurtures their psychological growth. Individuals experience autonomy when their actions are self-initiated or fully self-endorsed rather than controlled by external forces. In conditions in which any of these needs are neglected,
difficulties in engaging in self-regulated behavior arise, and well-being may be compromised.

SDT is a general theory of motivation and personality that evolved over the past three decades as a set of four sub-theories that share the organismic-dialectical meta-theory and the concept of basic needs (Deci & Ryan, 2002). The basic tenets of SDT theory and its mini-theories of (a) organismic integration theory, (b) causality orientations theory, (c) cognitive evaluation theory and (d) basic needs theory are illustrated in Figure 1. Each mini-theory was developed to explain a set of motivationally based phenomena that emerged from laboratory and field research focused on different issues. Cognitive evaluation theory addresses the effects of social contexts on intrinsic motivation; organismic integration theory addresses the concept of internalization especially with respect to the development of extrinsic motivation. Causality orientations theory describes individual differences in people’s tendencies toward self-determined behavior and toward orienting to the environment in ways that support their self-determination. Finally, basic needs theory elaborates the concept of basic needs and their relationships to psychological health and well-being. Together these mini-theories constitute SDT.

**Basic psychological needs.** The central concept that helps frame individual differences, situational variation, and growth within SDT is that of basic psychological needs. Deci and Ryan (1985) identified three such needs: (a) the needs for competence, i.e., feeling effective in one’s actions and capable of meeting the challenges of everyday life (Harter, 1978; White, 1963), (b) relatedness, i.e., feelings of connection and belongingness with others (Baumeister & Leary, 1995; Reis, 1994), and (c) autonomy, i.e., a concern for a sense of volition and a willing engagement in one’s behavior (deCharms, 1968; Deci, 1975). These three needs appear to be essential for self-
motivation, as well as for constructive social development and personal well-being. Although the expression of autonomy, competence and relatedness needs may vary at different points in development and may vary from culture to culture, a rich body of evidence has shown that satisfaction of these needs within varied contexts, domains, and relationships is essential across the lifespan (Ryan & La Guardia, 2000).

**Cognitive evaluation theory.** Cognitive evaluation theory (CET), a sub-theory in SDT, was presented by Deci and Ryan (1980) as specifying factors that explain variability in intrinsic motivation. CET proposes that experiences of competence and autonomy are both necessary conditions for facilitating intrinsic motivation. The theory argues that social–contextual events such as feedback, communications and rewards create feelings of competence that in turn enhance intrinsic motivation (Deci, 1975). CET further specifies that feelings of competence will not enhance intrinsic motivation unless accompanied by a sense of autonomy and that people must not only experience competence or efficacy; they must also experience their behavior as self-determined for intrinsic motivation to be in evidence (Deci & Ryan, 1980). Relatedness is also a key aspect of CET, the hypothesis being that intrinsic motivation is more likely to flourish in contexts characterized by a sense of security and belonging (Ryan & Grolnick, 1986). A crucial aspect of CET is that people will be intrinsically motivated only for activities that hold intrinsic interest for them, such as activities that have the appeal of novelty, challenge, or aesthetic value. For activities that do not hold such appeal, the principles of CET do not apply.

An important differentiation was first set forth as part of CET, which specifies that the functional significance of an external reward can be informational, controlling or can decrease motivation (Deci & Ryan, 1980). When rewards are perceived as informational and provide individuals with specific feedback that points the way to being
more effective in meeting challenges or becoming more competent, and does so without pressuring or controlling the individuals, it tends to have a positive effect on self-motivation. However, when rewards have controlling significance they tend to undermine self-motivation, investment, and commitment in the domain of the activity being evaluated (Grolnick & Ryan, 1987; Ryan, 1982).

**Organismic integration theory.** Within SDT, Deci and Ryan (1985) introduced a third sub-theory, namely organismic integration theory (OIT), to detail the different forms of extrinsic motivation and the contextual factors that lead to the degree in which a behavior has been internalized and integrated into an individual’s sense of self. The term *extrinsic motivation* refers to the performance of an activity in order to attain some tangible reward and, thus, contrasts with *intrinsic motivation*, which refers to doing an activity for the inherent satisfaction of the activity itself (Deci & Ryan, 1991).

The OIT contains different types of motivation or behavioral regulations that comprise a self-determination continuum (Deci & Ryan, 1985). The continuum runs from low to high self-determination as one moves from extrinsic motivation at one extreme to intrinsic motivation at the other. At one extreme on the self-determination continuum is amotivation, the state of lacking the intention to act. When amotivated, people either do not act at all or act without intent—they just go through the motions. Amotivation results from not valuing an activity (Ryan, 1995), not feeling competent to do it (Bandura, 1986), or not expecting it to yield a desired outcome (Seligman, 1975). The remaining continuum contains five classifications of motivated behavior (Deci & Ryan, 1985). At the opposite end from amotivation is the classic state of intrinsic motivation, the doing of an activity for its inherent satisfaction. Extrinsically motivated behaviors, by contrast, cover the continuum between amotivation and intrinsic motivation, varying in the extent to which their regulation is autonomous.
Extrinsically motivated behaviors that are least autonomous are referred to as *external regulation* (Deci & Ryan, 1985). Such behaviors are performed to satisfy an external demand or reward contingency. Individuals typically experience externally regulated behavior as controlled or alienated, and their actions have an external perceived locus of causality (deCharms, 1968). A second type of extrinsic motivation is labeled *introjected regulation* (Deci & Ryan, 1985). Introjection involves taking in a regulation but not fully accepting it as one's own. It is a relatively controlled form of regulation in which behaviors are performed to avoid guilt or anxiety or to attain ego enhancements such as pride. A more autonomous, or self-determined, form of extrinsic motivation is *identified regulation* (Deci & Ryan, 1985). This reflects a conscious valuing of a behavioral goal or regulation, such that the action is accepted or owned as personally important. Finally, the most autonomous form of extrinsic motivation is *integrated regulation* (Deci & Ryan, 1985). Integration occurs when identified regulations are fully assimilated to the self, which means they have been evaluated and brought into congruence with one's other values and needs.

**Causality orientation theory.** Causality orientation theory is the final sub-theory of SDT, and examines the role of individual differences in motivational orientations (Deci & Ryan, 2002). These individual differences are shaped by an individual’s experiences with social contexts, and inner resources that developed as a result of these interactions. Causality orientation focuses on the role these inner resources play in the current social context. Deci and Ryan (1985) developed the General Causality Orientation Scale (GCOS) that measures three types of motivational orientations based on the degree of self-determination involved when an individual engages in an experience or activity. These three types of motivational orientations are autonomy, controlled, and impersonal orientations. All three types exist in all
individuals, but the degree to which a person possesses each while engaging in a social context varies and these variations are thought to be relatively permanent (Deci & Ryan, 2000).

Types of motivation. Self-determination theory identifies several distinct types of motivation, each of which has specific consequences for learning, performance, personal experience, and well-being (Hein & Hagger, 2007). Within the organismic theory of motivation, each action or behavior is determined by the degree of intrinsic and extrinsic motivation it creates. Intrinsically motivated actions are defined as self-determination, whereas extrinsic motivated behaviors vary in their degree of self-determination, having either a relatively internal or external locus of causality. This perceived locus of causality (PLOC) continuum represents the degree to which the regulation of a non-intrinsically motivated behavior has been internalized.

Central elements of Deci and Ryan’s (1991) theory are the active organism and the social context. The first term refers to how one integrates “new experiences and regulatory processes with one’s intrinsic self” (p. 239). Self determination theory argues that, throughout their lives, individuals strive to achieve integration and cohesion of new ideas and interests both within themselves and with others. The social context is important because it can support or undermine this integrative process. Social factors, such as cooperation or approval will facilitate the organismic integration process and in turn, result in well-being and development. Thus, an individual’s motivation is presumed not be a direct function of social factors, but rather, the proposed motivational impact of social environments is mediated by the three innate psychological needs (autonomy, competence and relatedness).
Motivation and athletes. Research that has examined the motivation of elite-level athletes suggested that their behavior is not solely intrinsically motivated, but that multiple motives are likely to exist, and that the social conditions defining their participation are likely to have a significant effect on the motivational processes (Treasure et al., 2007). Although individuals initially become involved with sport for “play” and other intrinsic values, the demands of elite competition make this unsustainable. Mallet and Hanrahan (2004) investigated the multiple motives that elite athletes give for participating that encompass the range of the continuum for perceived locus of causality. Although their interview data revealed excitement, enjoyment, a love for competing at the highest level, and a sense of relatedness with teammates as important motives, less self-determined motives also emerged. Specifically, some athletes identified money and social recognition as motives while others spoke of the job aspect of the sport. Within the context of elite sport, these findings reinforce Deci and Ryan’s (1985) multidimensional conceptualization of extrinsic motivation. These results suggest that elite-level athletes find a way to internalize and integrate these extrinsic motivations in order to achieve more self-determined forms.

The difference between athletes who perform for more or less self-determined reasons is likely to be evident in their behavior toward performance, and can be seen by investigating their motivational triggers, whether it is to avoid disapproval (introjected regulation) or a focus on self-improvement (identified regulation). A fundamental tenet of self-determination is that individuals engaged in an activity by choice will experience better consequences than those whose participation is less autonomous. For example, flow is an optimal psychological state underlying peak performance in which a person experiences a number of positive experiences including freedom from self-consciousness, feelings of control and strong skill execution (Csikszentimihalyi, 1990;
Jackson, 1996). Vallerand (2007) found that self-determined motivation predicted positive consequences in performance ranging from concentration and flow, to persistence in the activity, curtailing burnout, and even sportsmanship. Kowal and Fortier (1999) examined relationships between situational motivation and flow in master-level swimmers. Results indicated that swimming for intrinsic reasons was positively associated with the highest levels of flow. External regulation and amotivation were negatively associated with flow. These findings suggest that cultivating self-determined forms of motivation and enhancing satisfaction of basic needs may facilitate an athlete’s attainment of flow state, which in turn may enhance an athlete’s performance. Gillet, Berjot, and Gobance (2009) found that self-determined motivation was conducive to the best sport performance with young national tennis players. Pelletier, Fortier, Vallerand, and Briere (2001) examined the associations between perceived autonomy support, motivational regulation, and persistence within competitive swimming. Findings demonstrated that self-regulation predicted persistence. Specifically, how an individual self-regulated had important implications for behavioral persistence.

Although socialization, health and well-being are important outcomes in sport, these are not critical in the context of elite-level sport where performance matters. Athletes who internalize a self-determined motivation regulation and train in an autonomy-supportive environment are likely to experience adaptive outcomes such as persistence, task perseverance, and coping strategies that have been shown to be determinants of athletic development and performance (Treasure et al., 2007). Perhaps most significant, given the myriad challenges and adversity that elite athletes face, self-determination research shows that autonomous motivation serves a vital role in protecting athletes from maladaptive training outcomes such as overtraining and
burnout (Lemyre, Treasure, & Roberts, 2006). Findings from research on the conditions that facilitate versus undermine human functioning in elite-level sport offer insight into the design of social environments that optimize general development and well-being. Training environments that support the autonomy of athletes appear to enhance self-determined motivation, which in turn, is vital in optimizing positive outcomes such as basic needs satisfaction, and task perseverance (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002). In the case of elite sport, much of training is not very interesting, and although vital to improving performance, can be quite repetitive and monotonous. Research has demonstrated that even the most tedious aspects can be tolerated through the use of interest-enhancing strategies that assist an individual’s internalization of motivation regulations (Green-Demers, Pelletier, Stewart, & Gushue, 1998). Another aspect of motivation that has been shown to help athletes attain positive performance outcomes is goal orientation, described in the next section.

**Goal Orientation**

Achievement goals embody the dynamic entities that represent an individual’s purposes for various processes and outcomes (Elliot, 2005). These motivating forces can affect athletes’ behavior, their feelings about themselves, and their focus of reference. Duda (1992) identified two global perspectives of athletic achievement, task involvement and ego involvement. According to achievement goal theory, these perspectives represent different ways in which individuals construe their competence and perceive themselves to be successful within their given context (Nicholls, 1989). An individual’s dispositional tendency toward adopting task and ego involvement is referred to as their goal orientation. When task-involved, individuals believe they experience success when they try hard and improve their skill in an activity. The individual focuses on the development of competence, and his or her sense of achievement is self-referenced. As a
result, individuals connect their competence to personal improvement and exerted effort towards task mastery. In contrast, ego-involved individuals make judgments about success relative to social comparison. In this case, a person feels successful when demonstrating performance that is superior to others, or if he or she is able to perform with comparably less effort than others.

Athletes’ interpretations of cues and expectations in the sport domain directly encourage their level of involvement. The types of comparisons performers make to formulate their perceptions of competence will likely affect their choice to invest in a specific activity, the amount of effort they expend in the activity, and their level of persistence when confronted by challenges (Duda & Hall, 2001). Ames (1992) differentiated between competitive goal reward structures that foster social comparison (ego orientation) and individualized structures that acknowledge improvement (task orientation). Task orientation encourages athletes to focus on the value of mastery, progress, and performance consistency over time. However, the way athletes perceive situational characteristics influences the degree to which ego or task mastery is regarded as salient. As a result, the positive contributions of tasks designed to offer challenge and personal choice may be undermined by social comparison based evaluation practices.

A major tenet of achievement goal theory is that individuals will be predisposed to task and ego orientations as a result of socialization experiences in their sport, and these orientations will subsequently influence their achievement goal states that may be displayed as task and/or ego behaviors (Nicholls, 1989). Even though it is these goal states that form the situational determinants of Nicholls’ achievement goal theory, researchers have based their examination of the broader beliefs, cognitions, affective responses, and values that characterize athletes according to their levels of task and ego orientation (Duda & Hall, 2001; Roberts, 2001). In contrast to initial research that
tended to study task and ego orientation separately, recent studies have recognized that individuals are capable of being high, moderate or low in both orientations (Fox, Goudas, Biddle, Duda, & Armstrong, 1994). As a result, many investigations incorporated goal profiling in order to gain a truer representation of achievement goals and their subsequent consequences (Biddle, 2001; Hodge & Petlichkoff, 2000; Roberts, Treasure, & Kavussanu, 1996). Four profiles were identified, namely high task/high ego; high task/low ego; low task/high ego; and low task/low ego. In particular, this allows two groups that have previously been neglected by correlational studies to be incorporated—high task/ high ego and low task/low ego (Hodge & Petlichkoff, 2000).

These achievement goals define patterns of motivation that represent different ways of being attracted to, engaged in, and reactive to achievement-related outcomes (Ames, 1992). For example, Harwood, Cumming, and Hall (2003) found that task and ego orientations were related to separate functions of imagery, and individuals with different goal orientations would vary cognitively on what needed to be done to achieve their goals. Participants with an ego orientation imaged successful demonstration of skills in comparison to others, whereas the task-oriented participants focused on the development and execution of skills, strategies, and personal mastery. Both orientations can lead to high perceptions of competence; however, when failure occurs, individuals with high ego orientation and low task orientation tend to feel incompetent because they were unsuccessful according to their own criterion for success—being superior relative to others. They have no mastery goals to fall back on, and therefore tend to avoid or drop out of activity due to low perceptions of success. This investigation illustrates the role that goal orientation plays in the development of sport-related skills and perseverance (Harwood et al., 2003).
Generally, high task orientation is advantageous, either singly or in combination with a high ego orientation (Duda, 1993). A task mastery climate was found to be related to higher perceived ability and self-confidence, which lowered performance anxiety (Abrahamsen, Roberts, Pensgaard, & Ronglan, 2008). Fox et al. (1994) found that high task/high ego and high task/low ego children were the most motivated in measures of sport enjoyment and perceived sport competence. Pensgaard and Roberts (2002) found similar results in elite-level athletes who reported to be high in both effort (task) and ability (ego) orientation. The addition of ego involvement to task involvement does not appear to be motivationally detrimental (Hodge & Petlichkoff, 2000). This combination makes sense for a high-achieving athlete. They are driven to win, but recognize that it is dependent upon their personal effort and skill development. They maintain their motivation by keeping their focus on areas within their own control rather than the outcome. Duda (1997) argued, “what makes these individuals motivated 'over the long haul' . . . is the fact that they have their strong task orientation to fall back on when their sense of normative competence is in jeopardy” (p.306). In this particular combination, task orientation appears to be the trigger for sustaining motivation. This perception of success moderates any debilitating effects that may potentially incur through an ego orientation (Roberts et al., 1996).

The manner in which an athlete defines success and failure and approaches achievement situations links directly to the development of mental toughness. An ego-involved athlete must demonstrate normative ability in order to feel successful. Thus, the psychological load for an ego-involved athlete, where criteria is dependent on others and out of personal control, is quite different from a task-involved individual, where the demands are self-referenced and within personal control. In both cases, ability and coping resources are instrumental in helping them feel more in control and gain
desirable outcome expectancies. For developing conditions that maximize mental toughness, attention needs to be paid to the influence and regulation of an athlete’s orientation.

Given the complexity of human motivation, Vallerand (2007) argued that motivation cannot be studied in general terms, but instead requires a collection of motivations that differ in type and level of detail. His hierarchical framework proposes that motivation operates at three levels: global, contextual, and situational. According to Vallerand, the global level is similar to a personality trait, and represents the manner in which the individual generally interacts with the environment, intrinsically or extrinsically. Contextual motivation refers to the relatively stable motivational disposition that an individual adopts towards a particular context such as sport or education. The third level of the hierarchical model is situational motivation and pertains to the more malleable ‘here and now’ motivation an individual experiences while engaged in a particular activity. These levels of motivation operate in a top-down effect, in that each stage of motivation is believed to correspond and impact the next (e.g., situational motivation is expected to be influenced more by contextual motivation than global motivation) in a recursive pattern in which a motivational experience at a lower level may affect the next level up leading to the development of more established motivational orientations. This framework reinforces the need to build a motivational profile in order to get a more comprehensive picture of the determinants and consequences of motivation as it relates to mental toughness.

Efforts to integrate self-determination theory and achievement goal theory present the mechanisms through which different achievement criteria can facilitate or hinder self-regulation and self-motivation (Deci & Ryan, 2000). Achievement goal theory focuses primarily on the effects of task and ego involvement on performance and
preferences for task difficulty, whereas self-determination theory examines the effects of goal involvement on intrinsic motivation. The behavior motivated by the task orientation of an individual can be conceptualized as intrinsically motivating and satisfying. These individuals are pursuing activities with a sense of autonomy by employing self-regulating processes and resources devoted to the inherent aspects of the task. On the other hand, behavior with an ego orientation focus on demonstrating superiority over others draws on an external locus of causality. Since individuals with an external locus of causality believe that the circumstances are not within their own control but instead feel pressured to prove their competence, individuals with ego orientation are positively related to more controlled forms of regulation on the SDT continuum, while task orientation facilitates more autonomous forms of motivation (Deci & Ryan, 2000).

As a result, when self-improvement is fostered in a certain context, the task at hand becomes more controllable. When individuals feel more competent and autonomous in relation to a given task, they are more likely to feel psychological growth (Deci & Ryan, 2000). In contrast, those with high ego involvement rely on a contingent outcome (whether they win or not), which can detract from the process-based factors that lead to success in the activity. With this in mind, Vallerand (2007) suggested that research is needed to look at how individual difference factors (goal orientations) prime the contextual-situational motivation relationship. In line with the hierarchical model, relatively stable individual differences that operate at the contextual level may have a top-down effect on situational motivation. Consequently, individuals’ dispositional tendency towards viewing success as self-referenced (task orientation) may make it more likely that their situational motivation is self-determined (intrinsic motivation/identified regulation), as their participation is directed by intrinsic (effort, learning, self-improvement) rather than extrinsic means (outperforming teammates).
Several studies confirm empirical links between self-determination and goal achievement theories in sport. Data collected on British university athletes from a variety of sports revealed that while high ego orientation alone positively predicted introjected and external regulation, high task orientation predicted all three types of intrinsic motivation as well as identified regulation, regardless of ego orientation (Ntoumanis, 2001). Results support the role of high task orientation in safeguarding potentially maladaptive effects of ego orientation. Similarly, students high in task orientation singularly or in combination with high ego orientation, reported higher levels of intrinsic motivation and identified regulation than their lower task oriented counterparts in the context of physical education (Standage & Treasure, 2002). These results support the idea that to influence the formation of positive self-worth, we need to support an internal regulation of behavior and behavior based on self-referenced criteria of success. However, given the frequent combination of high task/high ego found in sport, the ideal self-determined form for the athletic population may be integrated regulation when elite-level athletes have assessed and incorporated the behaviors and demands of the task with their external reinforcement (Treasure et al., 2007). As Ryan and Deci (2000) contended, behaviors depicting integrated motivation share many qualities with intrinsic motivation, although they are still considered extrinsic because they are done to attain outside approval rather than for personal needs.

**Linking Mental Toughness and Motivation**

Motivation may serve as a key mechanism underlying the development and maintenance of mental toughness. One dominant finding that emerged in several studies is that mental toughness seems to exist in the presence of, or as a response to adversity (Clough et al., 2002; Coulter et al., 2010; Jones et al., 2002; Middleton et al., 2004b). While reactions to adversity will differ from individual to individual, there are a number
of ways that athletes use their mental toughness to interpret and respond to these challenges. Motivational factors may play an important role in overcoming adversity. Jones et al. (2002) emphasized that mental toughness is not just about dealing with aspects of competition, but addresses training and lifestyle issues that present their own demands. Motivation is required for athletes to deal with the broader scope of these stressors so that they are able to consistently perform optimally. At the same time, mental toughness is believed to fluctuate during the time athletes spend in their respective sport (Jones et al., 2007). This suggests that mental toughness is a component that performers must continually attend to throughout their sporting profession. Motivational factors would determine the reasons and the conditions needed for athletes to successfully maintain a state of mental toughness throughout their career.

Studies that incorporated ranking procedures suggested that some attributes are clearly more important than others in developing mental toughness (Coulter et al., 2010; Jones et al., 2002; Middleton et al., 2004b). Motivation as a mental toughness characteristic receives overwhelming support. Loehr (1982) identified self-motivation and Fourie and Potgeiter (2001) reported that determination and commitment were characteristics of mental toughness. Jones et al. (2002) found that a majority of participants ranked elements such as enhanced motivation to use setbacks as a source of increased determination, and having an intense desire for success as a function of purely internalized motives, high in importance. The “Tough Attitudes” themes that emerged in Bull et al.’s research (2005) included a “never say die” mindset, and learning from failure rather than dwelling on it. Self-determination was exhibited by Middleton et al. who highlighted personal bests and personally significant tasks as key elements in their research. Bull et al. referenced the “go the extra mile” concept for athletes to get the most out of their ability and thrive on competition by finding meaningful personal challenge in
each match. When investigating maintenance of mental toughness, Connaughton et al. (2008) reported that having a burning desire and intrinsic motives to succeed were essential underlying mechanisms. Taken together, these key dimensions of mental toughness relate back to motivational factors where the athlete is driven by internal conditions prompted by the activity. Therefore, motivation is worthy of further scrutiny to better confirm the types of motivation best suited for mental toughness.

Collectively, athletes’ motivation and goal orientation along with their degree of mental toughness may outline their approaches to sport and predict their relative success in reaching a high level of performance. Decades of sport research indicates that athletes with higher self-determined motivation perform better, have enhanced concentration, persist longer, use positive coping strategies in stressful circumstances, and invest more effort in activities (Hall & Kerr, 1997; Ntoumanis, Biddle, & Haddock, 1999; Pelletier et al., 2001; Vallerand, 2007). With many of the same positive benefits resulting from motivation and mental toughness, researchers hypothesized that self-determined athletes evidence mentally tough-related behaviors. Van-Yperen and Duda (1999) found a link between task orientation and an increase in skilled performance over the course of a season in young elite athletes. Hall and Kerr (1997) found that young fencers with task goal orientations had reduced cognitive anxiety prior to competition. Ntoumanis et al. (1999) found that task orientation was associated with the use of positive problem-solving coping strategies, such as trying hard, seeking social support and minimizing activities that encourage competition. In contrast, student-athletes with high ego orientation scores were more likely to lose their cool and let out negative feelings. Hatzigeorgiadis and Biddle (1999) found that task-oriented snooker and tennis players had less cognitive interference than ego-oriented players with low perceived competence. An athlete who is ego involved seeks to use social comparison, and these
comparisons may give rise to negative performance anxiety when the comparisons are not favorable. These results suggest that belief in success as a function of one’s personal control leads to performance improvement and positive coping strategies. Individuals who participate in sport for intrinsic motives also tend to experience higher levels of positive affect, increased perceptions of satisfaction and competence, and persist at the activity longer (Treasure et al., 2007). Therefore, examining motivational preferences and goal orientation with athletes’ degrees of mental toughness may affect their level of achievement in the sport domain.

**Gender Differences in Motivation and Mental Toughness**

When studying the complexity of mental toughness, researchers can look at more established related constructs such as motivation to glean important knowledge and insight about internal processes and interpretations of social contexts that enable athletes to achieve success. Motivation is a key ingredient in understanding behavioral models as well as in determining the intensity and direction of behavior. By outlining the motivational profile of mentally tough athletes, my study will identify the personal variables required and ideal social contexts necessary to predispose individuals for this performance-related construct. Studies have begun to shed light on individual differences such as age, years of experience in sport or competition level and how they may influence the development of mental toughness. In particular, gender differences have received the most attention and need to be carefully considered. By identifying common attributes between the concepts of mental toughness and motivation, comparisons can be made that will influence the theoretical approach to developing and maintaining a high level of performance.

Many theories of motivation can inform researchers about the nature of individuals achieving peak performance. By ascertaining the nature of task and ego
profile groups, coupled with perceptions of competence, confidence and performance anxiety, researchers can better study how gender and other individual differences may affect related motivational constructs. These achievement goals define patterns of motivation that represent different ways of being attracted to, engaged in, and reactive to performance outcomes.

**Achievement motivation.** The contributions of Nicholls (1989) made a strong impact on achievement motivation research in sport. He established that dispositional goal orientations are central to success and failure assessment in performance contexts. These fundamental motivational constructs represent two notions of ability—task and ego orientation. Task orientation is the tendency to define success and judge one’s ability in a manner that is self-focused and targets effort and mastery. Ego orientation reflects the propensity to construe one’s competence on the basis of demonstrating superior ability over others. Task involvement couples with adaptive cognitive, affective and behavioral outcomes, while predominately ego orientation has the potential to lead to maladaptive psychological outcomes depending on ability perceptions (Duda, 2001; Nicholls, 1989). Research in the physical domain has provided support for this theoretical framework (Fox et al., 1994; Pensgaard & Roberts, 2002; Roberts et al., 1996). Elite athletes are reported to be both highly task-oriented and highly ego-oriented (Pensgaard & Roberts, 2002). This combination makes sense for a high-achieving athlete. They are driven to win, but recognize that it is dependent upon their personal effort and skill development. Nonetheless, work consistently shows gender differences in which males emphasize ego-involved goals more than females do (Vealy, 1988; Gill, Dzewaltowski, & Deeter, 1988; Duda, 2001).

**Self-determination theory.** Beliefs regarding ability and perceived difficulty influence performance, effort and persistence on a given task. These social cognitive
variables are, in turn, influenced by individuals’ perceptions of their own experiences and socialization pressures. Beliefs about one’s ability play a prominent role in motivation theory. For example, in self-determination theory, Deci and Ryan (1985) included competence as a basic need that individuals have and discussed how this need is a major reason why people seek out challenging activities. Kilpatrick, Herbert, and Bartholomew (2005) specifically examined college students’ motivations for physical activity. They found men reported higher levels of motivation than women for challenge, competition, social recognition, and strength and endurance, with the largest effect size difference for competition. Women rated only one motive, weight management, higher than men. This finding is consistent with men’s tendency to seek out types of activity that provide opportunities to demonstrate mastery and competence.

Deci and Ryan (2000) proposed self-determination theory as a framework to understand the social-contextual conditions that facilitate or undermine intrinsic and extrinsic motivation. Intrinsic motivation is associated with an internal locus of causality where enjoyment is derived from exploring, learning and playing the sport. On the other hand, extrinsic motivation is regulated by external demands such as reward, guilt or punishment. Competitive athletes demonstrate higher instances of identified regulation, a self-determined form of extrinsic motivation (Treasure et al., 2007). This finding is possibly due to the fact that elite athletes are usually quite committed to their sport and therefore, probably come to identify with and accept their choice to participate and invest in the demanding nature of the activity. Because extrinsic motivation, by definition, pertains to behaviors where the goals of action extend beyond those inherent in the activity itself, these athletes internalize the external contingencies and judge the behavior as being personally valued. Women consistently display higher levels of intrinsic motivation and self-determined motivational profile than men in sport (Chantel
et al., 1996; Fortier, Vallerand, Briere, & Provencher, 1995; Pelletier et al., 1995). Female athletes participate more out of pleasure and satisfaction than for extrinsic reasons. The greater propensity for females to take responsibility for their failures, coupled with their more frequent attribution of failure to lack of ability has been interpreted as evidence of internally regulated behaviors and subsequently more self-determined motivation for women.

**Competitive orientations.** Another related motivational construct is competitive orientations. According to Atkinson’s (1974) achievement motivation theory, highly achievement-oriented individuals approach performance situations with high standards, effort and persistence in the face of failure. These same behaviors should lead to success in athletics and tie into mental toughness in sports. Gill et al. (1988) investigated the competitive achievement orientations of high-level intercollegiate athletes using both general and sport-specific measures. Their results confirmed that high-level athletes are competitive in that they enjoy competition and strive hard for success, but their achievement satisfaction depends more on performance than on outcomes. Looking at gender differences, males scored higher than females on competitiveness ratings and win orientation. Females scored higher on performance orientation and scales that reflected mastery and desire to work hard. Although males are more competitive and win oriented than females, females’ orientation toward performance and personal goals within sport may well be associated with greater confidence, satisfaction, and achievement success. Therefore, even though the genders approach performance from different angles, a successful outcome may be reached by both parties.

An important sub question is whether athletes are particularly win or goal oriented as compared to non-athletes. While initial thoughts may suggest that successful
athletes must be highly win oriented, research points to performance orientation as more functional. Vealy (1986) proposed that a performance orientation was associated with greater control and confidence, therefore leading to greater athletic success. Duda (1989) reviewed considerable work on goal perspectives and sport behavior and concluded that athletes may not be as ego-involved and focused on win-loss outcomes as expected. Rather, perceived ability and task orientation is more associated with sport achievement.

**Performance anxiety.** Personal and situational motivational variables may buffer against performance anxiety in sport. Athletes’ perceptions of their environment and availability of social support are determinants for successful coping. An environment that encompasses strong interpersonal competition and team rivalry, as opposed to an environment emphasizing mastery and personal improvements, has been found to relate to more performance worries, reduced perceived athletic ability and less self-confidence (Papaioannou & Kouli, 1999). Gender differences have been reported in that females convey higher levels of performance anxiety than males (J. Thatcher, Thatcher, & Dorling, 2004; White & Zellner, 1996). However, this constitutes a theoretical contradiction. Females typically report higher task orientation than males, and athletes who are predominately task oriented should experience lower levels of performance anxiety than ego-oriented peers. Therefore, females should be less prone to experiencing performance anxiety than males.

Abrahamsen et al. (2008) investigated the potential interaction effects of whether coaches who foster a mastery climate increase the perception of social support and ability, which in turn, act as safeguards against performance anxiety. They found that females reported more performance worries, and were more influenced by the interaction of ego orientation and perceptions of a performance climate than their male counterparts. Males thrived on the competitive environment because it was more aligned
with their ego orientation. According to Ursin and Eriksen (2004), a possible explanation for this gender difference is a discrepancy in expectations, triggering a stress response. The stress response raises arousal levels and activates behaviors to cope with the demands. Thus, when a more task-oriented female enters a performance climate that is contrary to her motivation orientation, an alarm goes off. Depending on the athlete’s sense of control and perception of available resources for coping, the stress response is elevated. For females, their perceived ability mediates the relationship between a performance climate and anxiety. As long as the females had a positive expectancy to handle the stress, performance anxiety was less likely to occur. To counter-balance performance-oriented demands, Abrahamsen et al. recommend making the competition environment more mastery involving where seeking social support is seen as a desirable coping strategy and stress buffer. Such an environment increases perceived ability while reducing worries, and at the same time, helps in the perceived availability and use of coping sources. As this research demonstrates, being ego-involved may not be motivationally detrimental unless the athletes also have low levels of perceived ability.

Overall, achievement goal orientations have been established as particularly meaningful motivational constructs in the sports domain. Competitive environments are likely to promote a focus on winning, promoting ego involvement and subsequently a decrease in intrinsic motivation through its adverse effect on self-determination (Vallerand, 2007). Athletes are characterized by multiple motivations. Yet, maintaining a strong task orientation with high levels of perceived competence will promote positive psychological outcomes with high levels of effort and persistence. Each gender interprets his or her motivation from a different perspective. Females are more naturally inclined to express a mastery mindset while males rely on their higher confidence and competitive drive to rise up to their athletic challenges. The type of motivation that
underlies athletes’ behavior will have a profound impact on what they derive from their sport engagement but may result in the same positive performance end state.

**Gender differences in the present study.** The purpose of this study is to determine whether differences in motivation orientation will influence mental toughness, a concept that combines internal processes with social contexts in order to reach benchmarks for success. While gender differences may cause the motivational approach to come from opposite ends of the spectrum; men and women strive for the same end result—to attain athletic achievement. To be productive at the premier level, elite level athletes have benefited from having a combination of high task and high ego orientations. Highly successful athletes are driven to compete but with a performance-oriented mindset, therefore, both genders’ characteristics may be necessary for reaching peak performance in sports. These collective findings suggest that coaches should emphasize techniques that help athletes focus on controllable performance goals with built-in rewards. Regardless of task or ego orientation, competitive achievement resulting in greater perceived competence, whether based on confidence for males or ability for females is required to balance out gender differences. An increased focus on performance orientation may help promising athletes reach their full potential by developing their overall confidence and satisfaction. It is recommended that athletes set personal goals with their coaches that are challenging and target both improvement and winning (Mallett & Hanrahan, 2004).

Mental toughness is not an expression of motivation alone but combines motivation with a collection of components that determine athletic success. This research examines the motivational profile as it relates to mental toughness in collegiate athletes. Since several aspects contribute to motivation, I looked at the combined relationship among autonomous motives, goal orientation and mental toughness as they
lead to performance excellence. This combination will allow me to determine a more complete picture of the mechanisms and processes underpinning the development of mental toughness. Autonomous motivation represents internal and external factors that drive the athlete’s behavior and determine focus and persistence (Deci & Ryan, 2000). Goal orientation illustrates how athletes regard the challenge, and in turn, how their perceived competence directs their performance (Ames, 1992). It is evident that motivation is influenced by gender, therefore I needed to control for gender in order to make sure that my study results were not confounded by this variable. However, since research shows that perceived ability can mediate the circumstances, it is interesting to see that gender differences still affect mental toughness. Since perceived ability is tied to mental toughness, researchers would postulate that no significant differences should occur and mental toughness may be a contributing factor for equalizing gender in motivational approaches when competence levels are high.

The current study proposes to determine what mental toughness is and to look at the relationships among mental toughness, self-determination theory and achievement goal theory. While there are many aspects related to the construct of mental toughness, I wanted to refine this structure to identify which emotional, mental or physical components best define a collegiate athletes’ focus of reference, their feelings about themselves, and their resulting behavior. Given the association of motivational orientations from the self-determination continuum and goal orientations with positive performance outcomes, the theories offer complementary constructs for shaping mental toughness. All theories rely on internal processes and interpretation of social context to explain their consequences. As outlined previously, autonomous forms of motivation are likely to result in self-driven efforts because such behaviors are tied to personal enjoyment and interest. Goal orientations reflect perceived ability and how competent an
individual feels about performing competitive tasks. Mental toughness is the psychological state necessary for achieving performance success. Therefore, self-determination, as manifested in motivational preferences and goal orientation, may be a key factor in the construct of mental toughness. With these notions in mind, I investigated how motivational orientations relate to the processes and outcomes of mental toughness of collegiate athletes. Specifically, my research question is determining whether athletes with intrinsically regulated domains of self-determination along with task orientation will have a greater mental toughness score than those who are extrinsically regulated and report a high ego orientation.
CHAPTER 3. Method

Participants

The University of California, Berkeley (Cal) sponsors 27 varsity sports, with approximately 900 student-athletes. The excellence of the University's intercollegiate athletic program rivals the school's academic reputation. Since the 1973 season, the Golden Bears have had at least one national champion every year, totaling 76 national team championships and claiming nearly 200 NCAA individual crowns. Cal also regularly finishes among the Top 10 in the annual Directors' Cup standings, and is noted to be one of the best overall athletics programs in the country (National Association of Collegiate Directors of Athletics, n.d.).

Out of the 27 potential sports programs, teams were selected purposefully using the following criteria. I wanted a cross-section of sports representing various environments (field, pool, and track) as well as contact conditions, for example, water polo and soccer being more aggressive than softball or swimming. Also, I sought after individual versus team sports and programs that have made a national title appearance. All teams were currently competing and included their gender counterpart. Although not intentional, my resulting list of teams comprised of all Olympic sports that are non-revenue generating.

The sample consisted of 232 Cal student-athletes (male n = 119; female n = 113), representing 10 intercollegiate sports teams: Baseball (n = 26), Softball (n = 26), Men's Track and Field (n = 26), Women's Track and Field (n = 26), Men's Soccer (n = 26), Women's Soccer (n = 26), Men's Swim (n = 26), Women's Swim (n = 26), Men's Water Polo (n = 26), and Women's Water Polo (n = 26). The age range was 18-23 years (M =
19.82, $SD = 1.37$) consisting of 79 freshmen, 64 sophomores, 48 juniors, and 41 seniors.

Ethnicity was predominantly White as displayed in Table 4.

Table 4

*Ethnicity Breakdown by Sport*

<table>
<thead>
<tr>
<th>Sport</th>
<th>American Indian/Alaska Native</th>
<th>Asian</th>
<th>Black/African American</th>
<th>Hawaiian/Pacific Islander</th>
<th>White</th>
<th>Not Reported</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseball</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>20</td>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>Softball</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>M Soccer</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>10</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>W Soccer</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>15</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>M Swim</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>W Swim</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>M T&amp;F</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>15</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>W T&amp;F</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>24</td>
<td>3</td>
<td>37</td>
</tr>
<tr>
<td>MWP</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>34</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>WWP</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>13</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2</strong></td>
<td><strong>12</strong></td>
<td><strong>29</strong></td>
<td><strong>3</strong></td>
<td><strong>177</strong></td>
<td><strong>9</strong></td>
<td><strong>232</strong></td>
</tr>
</tbody>
</table>

**Procedures**

I administered a multi-section questionnaire during team meetings prior to regular practice sessions. Dissemination occurred on a team-by-team basis. All team members were invited to voluntarily participate and remarkably, no one refused. This could be due to Cal being a research institution where the student body regularly takes part in studies. In addition, students may have trusted the researcher who was on staff in the athletic department.

Four versions of the questionnaire (each with the measurement sections ordered differently) were used to control for any potential order effects. See Appendix B for a sample survey. At all meetings, instructions on how to fill in the questionnaire were given, emphasizing that responses should reflect athletes’ perceptions of the sport.
experience/environment, that there were no right or wrong answers, and that all responses were anonymous. Completion of the surveys took approximately 30 minutes.

**Instruments**

The study included the following measures:

**Demographic variables.** All athletes completed a brief demographic section assessing year in school, gender, ethnicity, sport, and number of years in sport experience at the collegiate level. See Appendix B for example.

**Self-determination.** The Sport Motivation Scale (SMS; Pelletier et al., 1995) is the most widely used to measure the various motivation styles proposed by self-determination theory in the context of sport. The SMS has 24 items that assess external regulation, introjected regulation, identified regulation, and three types of intrinsic motivation (to know, to accomplish, and to experience stimulation). Pelletier et al. found satisfactory internal consistency (Cronbach’s alpha coefficients ranging from .74 to .80) and construct validity were found for the six-factor structure that corresponds to the forms of motivation targeted by the scale (GFI=.94, AGFI=.92, NFI=.92, RMR=.05). For the purpose of the present study, an average rating response on all sub-scale items determined the autonomy score with the identified regulation, introjected regulation, and external regulation subscales reverse scored since they represent controlling forms of motivation (Pelletier & Sarrazin, 2007). This is useful for providing a single self-determination score, thus reducing the number of variables in the statistical analyses.

**Goal orientation.** The Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda, 1989; 1992) was used to measure individual differences in the tendency to identify with ego and task goals in a competitive sport setting. The stem for all 13 items was “I feel most successful in sport when...” and subjects responded on a 5-point
Likert scale (1 = strongly disagree and 5 = strongly agree) with 7 items measuring task orientation and 6 items measuring ego-orientation. For each dimension, the mean response determined the dimension score. The higher the score, the higher the respective orientation. The TEOSQ has been extensively utilized in research underpinned by achievement goal theory and possesses sound psychometric properties (Duda & Whitehead, 1998). Cronbach’s alpha coefficients for task and ego orientations were 0.69 and 0.79 respectively. Confirmatory Factor Analysis showed acceptable fit indices (CFI=.92, GFI=.89, NNFI=.92, RMSEA=.07).

Mental toughness. The Mental, Emotional, and Bodily Toughness Inventory (MeB Tough; Mack & Ragan, 2008) was used to measure an individual’s mental toughness on general principles of mental, emotional and physical components. Subjects responded to 43 items on a 5-point Likert scale (1 = Never and 5 = Always) indicating what seemed to best fit as it related to their experiences competing in sport. The global mental toughness score was calculated as the mean score for all 43 items. Three sub-measures of physical, mental and emotional elements enabled mental toughness to be further delineated into its respective constructs. Using the Rasch analysis model, the inventory demonstrated good model-data fit with acceptable fit statistics (mean infit mean square = 1.0 ± 0.5, mean outfit mean square 1.0 ± 0.5). The items had good variability along the measurement scale with item discrimination index and separation reliability statistic at 6.31 and .98, respectively. CSEM, which measures the precision of the tool to depict a specific ability level was fairly consistent across the ability range (0.24 to 0.34 logits).
CHAPTER 4. Results

Descriptive Statistics

Each variable was first screened for outliers and normality. Histograms were constructed and reflected that all the variables appeared to be approximately normally distributed. Table 5 presents the means, medians and standard deviations for all variables in the study. With a range of 1 to 5 for each factor, the scores show that the athletes had a relatively high mental toughness profile with global mean of 3.79 (SD = .46) and subscale means of 3.76 for emotional (SD = .49), 3.79 for mental (SD = .48), and 3.85 for physical (SD = .49) components. With regard to goal orientation, participants favored high task (M = 4.13, SD = .63) and moderate ego (M = 3.27, SD = .84). Mean value also revealed relatively high scores for autonomous motives (M = 3.63, SD = .40).

Table 5

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Mental Toughness</td>
<td>3.79</td>
<td>3.77</td>
<td>.46</td>
</tr>
<tr>
<td>Emotional Sub-measure</td>
<td>3.75</td>
<td>3.74</td>
<td>.49</td>
</tr>
<tr>
<td>Mental Sub-measure</td>
<td>3.79</td>
<td>3.80</td>
<td>.48</td>
</tr>
<tr>
<td>Physical Sub-measure</td>
<td>3.85</td>
<td>3.78</td>
<td>.49</td>
</tr>
<tr>
<td>Ego Orientation</td>
<td>3.27</td>
<td>3.33</td>
<td>.84</td>
</tr>
<tr>
<td>Task Orientation</td>
<td>4.13</td>
<td>4.14</td>
<td>.63</td>
</tr>
<tr>
<td>Autonomous Motives</td>
<td>3.63</td>
<td>3.67</td>
<td>.40</td>
</tr>
</tbody>
</table>

Motivational profile variables. Pearson product-moment correlation coefficients were computed to assess the relationships among the motivational profile mean scores of ego orientation, task orientation, and autonomous motives. Ego orientation had a mild negative correlation with autonomous motives (\( r = -.163, n = 232, \)
while task orientation had a moderate positive correlation with autonomous motives \( (r = .468, n = 232, p = .000) \).

**Assumptions**

Results of evaluation of the assumptions of normality of sampling distributions, linearity, homogeneity of variance, multicollinearity, and reliability of covariates were satisfactory. To test assumptions, the following statistics were performed. Box’s M demonstrates homoscedasticity which was found not to be significant. Box’s M = 28.24, \( F(18, 133754.5) = 1.53, p = .070 \), rejecting the null hypothesis that the covariances are not homogeneous. Levene’s Test looks at assumption of equal group error variances and was also found not be significant for all mental toughness variables: Emotion sub-measure \( F(3, 228) = .431, p = .744 \); Mental sub-measure \( F(3, 228) = .319, p = .812 \); Physical sub-measure \( F(3, 228) = .145, p = .933 \). Data were examined for any outliers. All variables showed normal distribution, and residuals were randomly distributed.

**Univariate Analysis**

Before utilizing multivariate techniques to test the hypothesis, a univariate analysis of variance was performed with categorical predictors to determine what factors were to be used in the final model. An analysis of variance (ANOVA) was conducted to compare the main effect of gender, class, type of sport, individual versus team sport, and national title appearance on global mental toughness score means. Ethnicity was excluded from the analysis due to low representation for each category which would skew results. Table 6 reports all test values. There was no significant effect for class, sport type, individual versus team sport and national title appearance at the \( p < .05 \) level. Regarding gender, scores were significantly higher for males \( (M=3.89, SD=.04) \) than females \( (M=3.69, SD=.03) \) for global mental toughness.
Table 6

ANOVA comparing Independent Variable Effects on Global Mental Toughness Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>3.10</td>
<td>1</td>
<td>3.10</td>
<td>15.92</td>
<td>.00*</td>
</tr>
<tr>
<td>Class</td>
<td>.61</td>
<td>3</td>
<td>.20</td>
<td>1.05</td>
<td>.37</td>
</tr>
<tr>
<td>Type of Sport</td>
<td>.71</td>
<td>3</td>
<td>.24</td>
<td>1.22</td>
<td>.30</td>
</tr>
<tr>
<td>Individual vs. Team Sport</td>
<td>.25</td>
<td>1</td>
<td>.25</td>
<td>1.28</td>
<td>.26</td>
</tr>
<tr>
<td>National Title Appearance</td>
<td>.04</td>
<td>1</td>
<td>.04</td>
<td>.21</td>
<td>.65</td>
</tr>
</tbody>
</table>

Multivariate Analysis

To determine the combined effect of motivational variables on fundamental sub-areas of mental toughness, a multivariate linear regression was conducted. Based on univariate analysis, only gender was entered, along with the motivation variables of task orientation, ego orientation, and autonomy; and mental toughness emotional, mental and physical sub-scales as dependent variables. Global mental toughness was not included since it is a composite of the sub-measures and would have a confounding effect. The multivariate effect was significant for gender, Wilks’ Λ = .919, F(3, 224) = 6.60, p = .00, indicating a difference in the level of mental toughness measures between male and female collegiate athletes. Separate univariate F tests showed there was a significant difference between males and females for each of the mental toughness sub-scales: emotional component, F(1, 232) = 17.51, p = .00; mental component, F(1, 232) = 12.78, p = .00; and physical component, F(1, 232) = 16.05, p = .00.

Based on theoretical considerations, the interactions for each of the motivational variables were tested rather than examining only main effects. The final model included gender with the following interactions: Task x Autonomy, Ego x Autonomy, Task x Ego x Autonomy. Significant associations were found for all combinations of variables while controlling for gender. See Table 7 for statistics related to multivariate effects. Partial eta
squared analyses provided an index of effect size. Univariate analyses displayed statistical significance (p<.05) for the majority of mental toughness measures. Only non-significant findings were found for the physical sub-scale for Ego/Autonomy (p = .16) and Task/Ego/Autonomy (p = .46). Refer to Table 8 for these results.

Table 7

Multivariate Effects of Final Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wilks’ Λ</th>
<th>F</th>
<th>df</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task x Autonomy</td>
<td>.795</td>
<td>19.40</td>
<td>3, 225</td>
<td>.00**</td>
<td>.21</td>
</tr>
<tr>
<td>Ego x Autonomy</td>
<td>.944</td>
<td>4.48</td>
<td>3, 225</td>
<td>.00**</td>
<td>.06</td>
</tr>
<tr>
<td>Task x Ego x Autonomy</td>
<td>.932</td>
<td>5.50</td>
<td>3, 225</td>
<td>.00**</td>
<td>.07</td>
</tr>
<tr>
<td>Gender</td>
<td>.901</td>
<td>8.20</td>
<td>3, 225</td>
<td>.00**</td>
<td>.10</td>
</tr>
</tbody>
</table>

Note. *p < .05; **p < .01

Table 8

Univariate Analyses of Final Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>F</th>
<th>df</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task x Autonomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional sub-measure</td>
<td>57.53</td>
<td>1, 227</td>
<td>.00**</td>
<td>.20</td>
</tr>
<tr>
<td>Mental sub-measure</td>
<td>44.28</td>
<td>1, 227</td>
<td>.00**</td>
<td>.16</td>
</tr>
<tr>
<td>Physical sub-measure</td>
<td>23.67</td>
<td>1, 227</td>
<td>.00**</td>
<td>.09</td>
</tr>
</tbody>
</table>

Ego x Autonomy

| Emotional sub-measure           | 11.66| 1, 227 | .00** | .05 |
| Mental sub-measure              | 5.94 | 1, 227 | .02*  | .03 |
| Physical sub-measure            | 1.95 | 1, 227 | .16   | .01 |

Task x Ego x Autonomy

| Emotional sub-measure           | 11.48| 1, 227 | .00** | .05 |
| Mental sub-measure              | 5.10 | 1, 227 | .03*  | .02 |
| Physical sub-measure            | .54  | 1, 227 | .46   | .00 |

Gender

| Emotional sub-measure           | 22.40| 1, 227 | .00** | .09 |
| Mental sub-measure              | 16.35| 1, 227 | .00** | .07 |
| Physical sub-measure            | 19.32| 1, 227 | .00** | .08 |

Note. *p < .05; **p < .01
Looking at parameter estimates among each of the mental toughness measures, Task/Autonomy has the greatest effect on global mental toughness ($\eta^2=.19$) and each of the sub-scales: emotional ($\eta^2 = .20$), mental ($\eta^2=.16$), physical ($\eta^2=.09$). The other two motivational profile groups had distant and relatively equivalent effect indexes for mental toughness measures. The Ego/Autonomy group effects ranged from .01 to .05 on the mental toughness scales. The Task/Ego/Autonomy group effects ranged from .00 to .05 on the various sub-scales. Task/Autonomy motivation had a significantly greater effect across all mental toughness components than the other two groups. These statistics show that when a collegiate athlete’s motivational profile includes task orientation with autonomous motives, it is more likely to be associated with mental toughness scores. However, ego orientation, even when combined with task and autonomous motives, had a substantially lower explained variance for mental toughness dimensions.
CHAPTER 5. Discussion

The present study sought to investigate how an individual’s motivational profile, specifically ego or task-orientation, along with his or her position on the self-determination continuum, shares a relationship with the collegiate athlete’s degree of mental toughness. I proposed that individuals who perceive their motivation to be high task-oriented, alone or in combination with high ego-orientation, along with a high degree of autonomy will have higher mental toughness scores than individuals who perceive their motivation to be only high ego-oriented with a lower degree of intrinsic motivation. The present findings supported this hypothesis with particular emphasis on the negative effects of ego orientation within the collegiate population.

Demographic Characteristics

This examination yielded important findings for the influence of demographic variables on mental toughness. Scores did not seem to differ by class status or ethnicity. In addition, athletes reported similar scores among different sport backgrounds. Aspects such as type of sport, the sport being individual versus team focused, and whether the team recently experienced a national championship title appearance, did not have substantial bearing on mental toughness. Similar results that mental toughness does not vary from situation to situation (individual versus team sports; contact versus non-contact sports) were reported by Nicholls et al. (2009) alluding to mental toughness acting more like a personality trait. These results emphasize the greater impact of the social and environmental influence on mental toughness rather than internal and biological aspects. The current study provides some additional evidence that these factors single-handedly do not predispose an athlete to mental toughness but rather an
individual acquires and develops mental toughness through hard work, practice and experience.

A particularly striking outcome was that baseball players reported the highest level of mental toughness compared to the rest of the athletes. Anecdotally, this team experienced an unusual set of circumstances this season. In late September, the University of California Administration announced that Baseball would be one of five programs to be eliminated by July 2011. By April, not only had the team raised $9 million to reinstate the program but it also qualified for the first College World Series appearance since 1992. The team survived a traumatic series of events while at the same time had their best season in nearly 20 years. This makes for a unique case study in considering contributions to athlete’s mental toughness. As the foundation for their model, Bull et al. (2005) emphasized “teachable moments” in an athletic career for developing mental toughness, and how the competition context forms a strong, stable base for greater consistency of achievement. This scenario is an excellent demonstration of how challenging environments can provoke positive growth of key elements. Mental toughness may be significantly influenced by the interaction between factors within the individual and the stressor or environmental characteristics. Certainly, these experiences brought the team together in a powerful way that boosted their mental toughness capacity.

**Autonomy**

As a whole, these results extend prior research that has linked autonomy with high levels of mental toughness (Ryan & Deci, 2000). Sport research has demonstrated that individuals engaged in activity by choice will experience better consequences than those whose participation is less autonomous (Vallerand, 2007; Kowal & Fortier, 1999;
Gillet et al., 2009; Pelletier et al., 2001). Autonomy was a consistent component of the motivational profiles which supported mental toughness. Athletes need to internalize and integrate behavior into their sense of self in order to nurture their psychological growth. This self-regulated approach manifests itself within the fundamental areas of mental toughness. In order for an athlete to be mentally tough, the individual must feel in control of his or her actions and capable of meeting the demands presented in sport.

**Goal Orientations**

Self-determination with goal orientation constructs was incorporated to account for global mental toughness and its emotional, mental and physical components. My aim was to understand the mechanisms behind the development of mental toughness in sport. The results provide support for the interaction premise using Nicholl’s (1984) goal orientation theory which contends that an individual’s behavioral and affective responses within a sport setting result largely as a function of his or her goal perspective and perceived ability. Goal orientations are likely to have effects on mental toughness because of their relation to competence. If an individual feels competent about performing competitive tasks, then he or she is more likely to have higher mental toughness. For example, among the athletes who have a high task orientation accompanied by a high level of perceived ability, a behavioral pattern is predicted characterized by a stronger work ethic, persistence in activity, lower competitive stress, and optimal performance—all aspects of mental toughness (Ames, 1984; Duda, 1989; Dweck, 1986). Consistent with these prior results, the present analyses revealed that task involvement was the strongest predictor of mental toughness dimensions. However, based on the interaction results, it is important to note that autonomy must be included with any motivational profile. Autonomous forms of motivation are likely to result in high mental toughness because such behaviors attend to personally valued goals and
these satisfy needs for competence. Ego involvement, even paired with autonomous motives was not sufficient to bring the collegiate athletes to the same level of mental toughness as their counterparts who reported task oriented motives. Whereas, Hatzigeorgiadis and Biddle (1999) indicated that a positive relationship between task involvement and adaptive responses was generally evidenced regardless of perceived competence levels. These results imply that the development of a task-oriented and autonomous sport environment may represent the best strategies for developing mental toughness.

**Ego Orientation**

While autonomous motives are essential in the motivation profile, they do not possess the ability to override goal orientation. In the present study, ego orientation alone or in combination with task orientation was not as strong a predictor of mental toughness as task orientation alone. Pensgaard and Roberts (2002) found that elite athletes benefitted from both orientations, and Hodge and Petlitchkoff (2000) suggested that task and ego orientation could be complementary in a competitive situation. At the collegiate level, this does not seem to be the case. Ego orientation depends on superiority over others. The collegiate level is the culmination of many talented athletes across the nation coming together on one team. Where an athlete could have been the best in their local area, now they are potentially not as much of a stand-out on their college team. If their goal orientations are based on social comparisons, it is much more difficult for athletes to feel confident about achieving their goals. This mindset diminishes the power of autonomy and as a result, negatively impacts mental toughness. Even when athletes had combined task and ego orientations, it was not enough to boost their mental toughness scores to the same level as athletes who had task orientation alone. These results demonstrate the tremendous peer pressure at the collegiate level that
manipulates an athlete’s beliefs. If the individual buys into the belief that success is based on outperforming others, there is less chance of that happening than for an individual who is striving for skills mastery. Developmentally, ego orientation may still be too unstable at this point to provide positive mental toughness benefits and it is not until the higher elite levels where athletes are better adapted to meet the demands of competition that ego orientation may be beneficial.

**Gender Differences**

In the present study, male athletes reported higher scores than females on global mental toughness as well as across each of the sub-components. This finding could be due to the male athletes’ strong confidence and competitive nature leading them to over-inflate their assessment (Gill et al., 1988). Research shows that men have a tendency to seek out types of activity that provide opportunities to demonstrate challenge and social recognition (Kilpatrick et al., 2005). Male athletes typically emphasize more ego involvement than females, with males’ stereotyped tendency toward a winning mindset while presenting themselves as superior over others (Vealy, 1988; Gill et al., 1988; Duda, 2001). However, we learned from this study that ego orientation lowers mental toughness scores so while male athletes are more likely to be ego involved, this motivation factor could make them more vulnerable to losing their mental toughness edge at the college level. An increased focus on performance orientation is particularly crucial for male college sports teams because the athletes’ mental toughness is susceptible to their competitive nature.

**Mental Toughness Sub-measures**

Interestingly, all mental toughness sub-measures produced similar results. The expectation of the mental toughness instrument was to delineate toughness into a 3-
dimensional concept: the physical element of being well prepared and acting tough; a mental element of empowerment and coping; and an emotional element to reflect flexibility and resiliency. Two possible explanations for this unanticipated result are that motivation may encompass all aspects of mental toughness, explaining why none of the sub-scales were differentiated. Another possible cause is that mental toughness may be such an intricate construct that one cannot isolate any particular component without having a bearing on the others. It should be noted however that the particular sports included in the sample could have influenced the lack of differences found in motivational elements. This study explored the general relationship between motivation and mental toughness, and using a more multi-faceted measure of mental toughness in future research may better discern its connection to performance excellence.

Mack and Ragan (2008) developed this measure based on Loehr’s (1994) practitioner-oriented model which defined mental toughness as “being able to perform consistently toward the upper range of one’s ability regardless of competitive circumstances” (p. 126). The original purpose of this instrument was to assess individuals during rehabilitation. While the tool was based on toughness training strategies, Mack and Ragan’s operational definition may have been too vague to address the specific motivation aspects as they relate to what the current research was investigating. For this reason, the item structure may not have appropriately delineated mental toughness as expected. Utilizing a measure that better aligns to motivational principles will improve insight into its relationship to mental toughness.

Limitations of the Present Study

This study, like most others, has limitations in its applicability. I examined differences in mental toughness based on individuals’ goal orientation and self-
determination levels. Because the sample tested was restricted to athletes from the same university, the results may have limited generalizability to athletes in other schools. Also, the represented sports did not include revenue-generating programs such as football or basketball. This might have influenced results because athletes in revenue-generating sports have additional pressures and a wider public awareness than athletes in non-revenue producing sports. In addition, the unique nature of college athletics brings into play other external influences such as scholarship awards, international student-athlete experience and social recognition that need to be considered. These aspects may have manipulated the findings in some manner.

There is a continual need in research to develop a valid and reliable measure of mental toughness. This research attempts to quantify mental toughness and goal orientations using psychometric measures. There is an inherent danger in asking participants to assign a number value to mental concepts or for researchers to design an instrument that accurately encompasses such a complex psychological construct. Mental toughness research is primarily grounded in qualitative approach and the lack of distinction within the sub-measures could be due to instrument limitations. The dependent measure used in this research depicts broad aspects of mental toughness and further validation for accuracy is required. The constraint of a single instrument developed under a specific operational definition cannot be overlooked. Using different mental toughness instruments may yield results that better identify specific factors that discriminate relationships with motivation variables. In addition, demand characteristics and social desirability are potential threats when using self-report measures. While quantitative measures are more convenient, the complexity of mental toughness keeps research in this area convoluted. Further study could benefit from multi-source ratings of mental toughness and motivation observed from coaches and teammates in order to
evaluate the reliability of self-reported scores. Future research is required to delineate those aspects of motivation that contribute most to the effects of mental toughness using a combination of quantitative and qualitative methodologies as well as subjective and objective data.

**Conclusions and Future Research Prospects**

The purpose of this study was to discover, describe, and understand mental toughness as it relates to motivational aspects of collegiate athletes. As important psychological constructs for performance excellence, these two key variables are relied on by athletes for determining competitive success. This research investigates whether mental toughness is stronger in athletes with motivational variables that are tied to winning (ego) or motivational variables that are tied to high personal goals (task).

Top-level sport is characterized by a demand to excel at optimal levels while performing under conditions that are considered extremely challenging. Recent research investigating motivated behavior within the physical domain has predominately been conducted from a social cognitive perspective (Roberts, 2001). This approach places an emphasis on an individual’s cognitions to explain the reasons for their behavior in different social contexts. Analyzing the effects of the internal processes with social context will verify whether motivational variables predispose athletes to be more mentally tough. Self-determination appears to be the primary theoretical framework associated with the mental toughness construct. Yet, autonomous motives are not enough to override ego orientation at the collegiate level. Ego involvement leads to mental toughness decrements and reduced intrinsic effect whereas task involvement likely leads to greater achievement and perceived success (Treasure et al., 2007). Thus, the psychological load for an ego-involved athlete, where the criteria are other-referenced and out of personal control, is quite different from that of a task-oriented
individual, where the demands are self-referenced and within personal control (Connaughton et al., 2008). As a result, autonomy is important to feel more in control and gain positive outcome expectancies.

When elite athletes reflected on their sports career, they noted the middle years as a turning point when they became more competitive and felt a heightened determination to succeed (Connaughton et al., 2008). Once developed, their mental toughness was maintained by a desire and motivation to succeed that was insatiable. The current research indicates that the college experience may be the critical period for ego development. As the athletes adjust to the higher level of competitiveness, those with ego orientation may feel a temporary drop in their mental toughness as they allow the ego to drive their behavior rather than integrating external values. For the college athlete, there may be a disconnect between ego orientation and mental toughness while the criteria is dependent on others and not within personal control. Recognizing the counterproductive nature of ego with mental toughness at this career juncture is a vital aspect to motivation as it affects performance quality.

Motivational climate. Motivation is a complex, multidimensional construct in which people can be motivated for different reasons that can be modeled on a continuum according to the extent to which behavior is congruent with the individual’s sense of self (Deci & Ryan, 2000). As one of the psychological needs energizing individuals to engage in sport, autonomy, in which behavior is freely chosen is perhaps the most essential for optimal development (Treasure et al., 2007). This study found that the nature of the sport setting and most demographic characteristics did not play a role in levels of mental toughness. Future research will determine whether mental toughness is predisposed by sport characteristics or more focused on learning, experience, and motivational aspects.
Knowledge of the roles of motivation in sports may assist athletes and sports faculty to create a productive environment that will maximize performance. Researchers have shown the importance of developing high levels of task-oriented motivation so athletes find satisfaction in mastering their sport, regardless of the outcome, while keeping a positive perspective on how well they perform and what they can learn from each experience (Abrahamsen et al., 2008; Fox et al., 1994; Pensgaard & Roberts, 2002). At the same time, athletes need to be competitive and be fueled by the challenges of their opponents that are represented in ego orientation, but only to a certain extent. Wanting to win and paying attention to their opponents are advantageous attitudes and behaviors as long as they do not overshadow an athlete’s intrinsic drive to work on skills. For the college athlete who has focus on external outcomes, too much volatility is created to provide security for mental toughness to develop. At this level, ego orientation needs to be minimized as much as possible in order to improve opportunities for success.

Interventions to move more individuals into a highly motivated, mentally tough mindset might involve changes to the motivational climate, aiming to promote a greater autonomy-supportive environment, and strategies to enhance the task-oriented belief that improvement in ability is possible through learning (Ames, 1992; Ryan & Deci, 2000). In particular, coaches need to facilitate perceptions of competence through goal achievement. For example, coaches could design activities in which evaluation criteria are based on self-referenced improvement. This research demonstrated that motivation is a key contributor to shaping mental toughness. Keeping in mind how each gender approaches performance, effort and persistence by looking through the lens of motivation will aid practitioners in developing more effective individualized strategies for boosting mental toughness levels in athletes.
**Mental toughness beyond the sports realm.** Sport is a way to enhance development on a personal and performance level. Because sport is a time-limited, concrete, personal, and intense experience, it is an ideal environment to assess motivation and performance that will most likely generalize across a number of life domains (Danish et al., 2005). When studying physical contexts, the social cognitive perspective borrowed from educational psychology has become dominant in the past two decades. Investigating the social environment can provide significant cues for enhancing sport. Sport can also contribute to psychology; the knowledge that is gained in regards to motivation and goal structure can be applied to other educational contexts. Sport is similar to an academic context where teachers are searching for ways to get the best out of their students and to develop learning situations for effective academic achievement. If deliberate procedures are employed, athletes can benefit from transferring their mental toughness to other aspects of their life.

There are striking similarities between a coach’s and educator’s role in their hunt for performance excellence. If we can dissect the motivational profile to discover dimensions that lead to the highest quality of self-determination, we can begin to incorporate these aspects into the delivery style and messages that we are sending to the learner. Simple changes that provide ways to define success other than winning or grades, such as setting goals that are focused on performance, along with many process goals for how to direct the learner’s attention and keep concentration on his or her own skill ability may create the desired motivational climate that breeds achievement. Empowering the athlete or student to be more involved in the process is essential with his or her own voice being part of the goal setting, feedback and performance monitoring.
These research findings begin to clarify the relationships among different forms of motivation and mental toughness. By linking internal processes and the interpretation of social context, these constructs advance a holistic approach using positive psychological variables to explain successful performance. The resulting motivational profile of task orientation combined with autonomy discloses particular strategies for performers to implement in order to achieve a state of mental toughness. Systematic monitoring of changes in an athlete's quality of motivation may represent an important tool in the prevention of maladaptive performance outcomes within sport. While members of the sports world may selfishly want to pursue how mental toughness can produce champions, all will benefit from this research on motivation.

This study provides the concept of mental toughness with increased conceptual clarity because it extends the generalizability of previous research in a unique way. The population sample included a diverse cross-section of collegiate ranks, including various sport settings from the pool to the soccer field, and individual versus team dynamics. Because the collegiate population is one step away from elite standing, it may be more worthwhile to study these participants as they refine mental toughness rather than individuals who have already reached that level of success. Particularly when examining motivational variables, asking the question of “What is it going to take to get me to the highest level?” is more imperative to the collegiate athlete than one who has already attained professional status. Also, mental toughness broadens its effectiveness at this level in regards to transferability as participation in sports may have the potential to enhance personal development (Danish et al., 1992; 2005). The benefit for collegiate athletes serves a dual purpose: a way to improve their sports performance as well as a way to become better students and productive community members. Mental toughness
and motivation are essential requirements to deal with the demands and challenges of the student-athlete lifestyle.

The social context has a powerful effect upon development of motivational orientations. Being able to generalize results may depend more on the training environment that is established by coach and team dynamics. If mental toughness requires a setting that encourages mastery and autonomy, then the onus is on the coach to provide those conditions aimed at improving performance and skill enhancement with self-governing behaviors. With a connection made between motivational variables and mental toughness, results can be extended to various populations based on the social cognitive influence of motivation and not sport background such as setting, experience, or achievements. The present study has particular value because what is taken beyond the college scene is an understanding of the processes of mental toughness. A key aspect of mental toughness in regards to which motivational profile is more conducive to fostering this construct was revealed. Further research will be necessary to validate these claims, and to generalize them to athletes in other sports, and in other schools with diverse competitive standards. Yet the present study sets the stage for determining how motivation is linked to mental toughness, and those trends can be applied to make predictions about the greater sport population, and possibly into other realms of endeavor such as academics or work environments.

Ultimately, sport stresses winning as well as good personal performance and effort. Athletes have several motivational choices that will contribute to their levels of achievement. Their decisions about effort, adherence, and persistence make a difference in their quality of experience and ability to flourish in high-pressure competitive environments. These critical decisions may be the deciding factors for building mental toughness, and in the end, what propels athletes to their peak performance state.
Figure 1. Overview of motivational theories: Self-Determination Theory and its sub-theories and Achievement Goal Theory.
APPENDIX A

University of Hawai'i
Consent to Participate in Research Project:
Investigating the Motivational Profile of Mentally Tough Collegiate Athletes

My name is Amy Bair, and I am a graduate student at the University of Hawaii conducting my dissertation research. The purpose of my project is an examination of strategies used by collegiate athletes to reach and maintain high performance levels during competition. I am asking you to participate in this research because you currently a student competing in intercollegiate athletics.

Project Description - Activities and Time Commitment: Participants will fill out a questionnaire given at one of your team meetings. Completion of the inventory will take approximately 20 minutes. Around 250 people will take part in this project.

Benefits and Risks: There are no direct benefits to you in participating in my research project. However, the results of this project might help me and other researchers learn more about achieving and maintaining high level of performance in collegiate sports. There is little or no risk to you in participating in this project.

Confidentiality and Privacy: This questionnaire is anonymous. I will not ask you to provide any personal information that could be used to identify you.

Voluntary Participation: Participation in this research project is voluntary. You can choose freely to participate or not to participate. In addition, at any point during this project, you can withdraw your permission without any penalty or loss of benefits.

Questions: If you have any questions about this project, please contact me at via phone (510) 219-0470 or email (abair@apexperform.com). You can also contact my dissertation chair, Katherine Ratcliffe, at (808) 956-4281 or email (ratcliffe@hawaii.edu). If you have any questions about your rights as a research participant, you can contact the University of Hawaii, Committee on Human Studies (CHS), by phone at (808) 956-5007 or by email (uhirb@hawaii.edu).

Please keep this page for your records.
Completing the questionnaire is indication that you agree to participate in this project.
APPENDIX B

MOTIVATIONAL PROFILE FOR MENTALLY TOUGH COLLEGIATE ATHLETES

DEMOGRAPHIC INFORMATION

Sport:  
Class (circle one): Senior  Junior  Sophomore  Freshman

Gender:  M  F  Number of years in sport experience at the collegiate level:

Age:

Ethnicity (circle one):  
American Indian/Alaska Native  
Asian  
Black/African American  
Native Hawaiian/Pacific Islander  
White

PART A

Using the scale below, please indicate to what extent each of the following items corresponds to one of the reasons for which you are presently competing in your sport.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Why do you compete in your sport?
1. For the excitement I feel when I am really involved in the activity
2. Because it's part of the way in which I've chosen to live my life
3. Because it's a good way to learn lots of things which could be useful to me in other areas of my life
4. Because it allows me to be well regarded by people that I know
5. I don't know anymore; I have the impression of being incapable of succeeding in this sport
6. Because I feel a lot of personal satisfaction while mastering certain difficult training techniques
7. Because it is absolutely necessary to do sports if one wants to be in shape
8. Because it is one of the best ways I have chosen to develop other aspects of my life
9. Because it is an extension of me
10. Because I must do sports to feel good about myself
11. For the prestige of being an athlete
12. I don’t know if I want to continue to invest my time and effort as much in my sport anymore
13. Because participation in my sport is consistent with my deepest principles
14. For the satisfaction I experience while I am perfecting my abilities
15. Because it is one of the best ways to maintain good relationships with my friends
16. Because I would feel bad if I was not taking time to do it
17. It is not clear to me anymore; I don’t really think my place is in sport
18. For the pleasure of discovering new performance strategies
19. For the material and/or social benefits of being an athlete
20. Because training hard will improve my performance
21. Because participation in my sport is an integral part of my life
22. I don’t seem to be enjoying my sport as much as I previously did
23. Because I must do sports regularly
24. To show others how good I am at my sport

PART B

Consider the statement, "I feel most successful in sport when..." and read each of the following statements listed below. Indicate how much you personally agree with each statement using the corresponding scale.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. I am the only one who can do the play or skill
2. I learn a new skill and it makes me want to practice more
3. I can do better than my friends
4. The others cannot do as well as me
5. I learn something that is fun to do
6. Others mess up and I do not
7. I learn a new skill by trying hard
8. I work really hard
9. I score the most points/goals/hits, etc.
10. Something I learn makes me want to go practice more
11. I am the best
12. A skill I learn really feels right
13. I do my very best
PART C

Read each statement and use the following scale to indicate your reaction for each of the responses. Select the response that seems to best fit you as it relates to competing in your sport.

\[
\begin{array}{cccccc}
\text{Never} & \text{Rarely} & \text{Sometimes} & \text{Often} & \text{Always} \\
1 & 2 & 3 & 4 & 5 \\
\end{array}
\]

1. Because I'm physically fit, I have a high tolerance for the physical stress of competition.  
2. I can take a punch emotionally and recover quickly.  
3. I have a clear understanding of my ideal state of physiological and psychological arousal.  
4. Surprising emotional shifts don't bother me.  
5. Unfavorable competitive circumstances often negatively affect my performance.  
6. Under the pressure of competition, I think constructively and positively.  
7. During stressful times, I have the ability to act tough.  
8. I respond to crisis and pressure with a sense of challenge and determination.  
9. I have the ability to balance stress and recovery in my training.  
10. Emotional setbacks are difficult for me to overcome.  
11. I am at my optimal physiological arousal state during competition.  
12. When stressed, I have the ability to maintain my emotional balance.  
13. I have the ability to cope with crisis and adversity.  
14. The emotional demands of competition sometimes exceed my ability to cope.  
15. Regardless of how I really feel when competing, I display confidence and energy.  
16. I am willing to commit 100 percent emotionally to the battle.  
17. I have the ability to access powerful positive emotions during competition.  
18. The physical demands of competition sometimes exceed my capacity for coping.  
19. After making the unthinkable mistake, I am able to keep fighting the good fight.  
20. I can control the feelings and emotions I need to experience in order to perform at my best.  
21. I sometimes allow my negative emotions and feelings to lead me into negative thinking.
22. During competition, I can quickly change from a negative emotional state to a positive one.

23. When the going gets tough, I have the emotional strength to fight back.

24. My body language helps me achieve my best performance state.

25. I am emotionally responsive and engaged under pressure.

26. It is hard for me to trigger the right internal emotional climate for maximum competitive success.

27. Whenever possible, I enter competition fully recovered.

28. I have the ability to bounce back quickly following mistakes and disappointments.

29. It is difficult for me to maintain my competitive psychological and physiological balance.

30. I remain calm and collected when experiencing the wild emotional swings of competition.

31. I can handle competitive mistakes and failures.

32. I have emotional strength under pressure.

33. I am willing to put myself totally on the line and risk losing.

34. I love the heat of battle.

35. I can sustain a great volume of physical stress without problems.

36. After missed opportunities, I jump back into the fight fully ready to resume battle.

37. When needed, I have the ability to trigger my optimal performance state.

38. I have the ability to absorb unexpected emotional changes.

39. Under the pressure of competition, negative emotional states are hard for me to change.

40. I can sustain a powerful fighting spirit against almost impossible odds.

41. No matter what the circumstances, I physically project determination and fight.

42. As the battle rages, I sometimes become withdrawn and emotionally disconnected.

43. During competition, I experience feelings of confidence, energy, and fun.
APPENDIX C

Codebook for Independent and Dependent Variables

Sport Motivation Scale (Pelletier et al., 1995)

Autonomous Motives = mean score of Question #1 – 24

*Note: Reverse Scored Items on Question #4, 5, 7, 10, 11, 12, 16, 17, 19, 22, 23, 24

Task and Ego Orientation in Sport Questionnaire (Duda, 1989; 1992)

Ego Orientation = mean score of Question #1, 3, 4, 6, 9, 11

Task Orientation = mean score of Question #2, 5, 7, 8, 10, 12, 13

Mental, Emotional, and Bodily Toughness Inventory (Mack & Ragan, 2008)

Global Mental Toughness = mean score of Question #1-43

Physical Sub-measure = mean score of Question #1, 7, 9, 15, 18, 24, 27, 35, 41

Emotional Sub-measure = mean score of Question #2, 4, 6, 10, 12, 14, 16, 19, 21, 23, 25, 28, 30, 32, 33, 36, 38, 40, 42

Mental Sub-measure = mean score of Question #3, 5, 8, 11, 13, 17, 20, 22, 26, 29, 31, 34, 37, 39, 43

*Note: Reverse Scored Items on Question #5, 10, 14, 18, 21, 26, 29, 39, 42
REFERENCES


